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THE  
NEMATODE PARASITES  
OF VERTEBRATES

BY

WARRINGTON YORKE, M.D.

*Professor of Parasitology, University of Liverpool and Liverpool  
School of Tropical Medicine*

AND

P. A. MAPLESTONE

M.D., D.S.O.

With a Foreword by

C. W. STILES

*Professor of Zoology, United States Public Health Service*

WITH 307 ILLUSTRATIONS



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## FOREWORD

So long as a given group of animals retains its status as of only academic interest, the taxonomic literature dealing with it remains relatively restricted and the authors relatively few, so that it is not especially difficult for systematists to keep themselves informed in respect to current publication. Thus, in the days of Rudolphi, Dujardin, and Diesing, the nematodes were of interest chiefly as zoological objects, and authors sought knowledge regarding them primarily for the sake of knowledge. True, a few genera like "*Ascaris*" and "*Strongylus*" were of some slight interest in human and veterinary medicine, but this fact played a distinctly secondary rôle in nematological studies.

Gradually the point of view changed as Zenker, <sup>1</sup> Cobbold, Manson, R. Blanchard, and others, pointed out the reaching medical and economic bearings of nematology. Some of us, whose hair has already turned gray, lived through the transitional stage of the subject, and can recall the days when our colleagues in other groups—still on an academic basis—looked upon us just a little askance and even expressed regret that we were drifting away from purely academic to applied science as we studied the effects produced by nematodes and sought measures to combat them.

What a changed viewpoint exists to-day! With no disrespect to early authors, it may be truly said that the present tendency is to seek knowledge for the sake of the good it will do rather than for the sake of knowledge itself. And with this changed viewpoint, the number of workers has increased, the literature has grown, known genera and species have multiplied  $x$ -fold, and it is becoming increasingly difficult for an investigator to orientate himself in nematology. The seriousness of this situation becomes the more evident when the fact is considered that as the geographic distribution of the workers extends away from library centres, such as Berlin, London, Paris, Vienna, Washington, etc., the investigators on the periphery labour under a radially increasing handicap.

The authors of this book have kindly given me the opportunity of looking through their proof sheets, and in this perusal four thoughts in particular have occurred to me to which, as a member of the passing generation, I take the liberty of giving verbal expression.

As I compare the early history of helminthology, and its outstanding spirit to seek knowledge for the sake of knowledge, with the present tendency to seek knowledge for the sake of its potential practical application to human and animal welfare, it is difficult to escape a comparison between the man who seeks money for the sake of money and the man who seeks money in order to apply it to the practical benefit of mankind. This does not mean that I view Rudolphi as an Intellectual Miser; far from it, for he bequeathed his accumulated knowledge to us. It does, however, mean that in the rising generation of helminthologists I see a motive which is not apparent in the early literature of Goeze, Batsch, Rudolphi. and Zeder. They dug the ground and laid the foundations which have made it possible for later generations to continue the structure, from the upper story of which the rising generation of students obtain a view denied to their fore-runners of the eighteenth century and of the early part of the nineteenth.

The second thought is that in this broadened view of the rising generation, it is to be confidently hoped that workers will not overlook the fact that the broader and more modern view of applied helminthology cannot widen indefinitely without extending the foundation in various horizontal radii. The time will never come when a man or woman can apply knowledge without first gaining it. Applied science can never divorce itself from abstract science. A man cannot give without first gaining, despite the fact that the Intellectual Miser can gain without later giving. Therefore, in our efforts to apply knowledge, let us not go to an extreme and exhaust our stock, but rather let there be a well-planned effort—as exemplified by this book—continually to build up and systematize the knowledge which we hope to apply.

The third thought which arises in my mind in this pleasurable perusal of the proof sheets is a cold-blooded mathematical calculation. Here is a book which will enable many men on the periphery of library facilities to have telephone communication, so to speak, with the library centres; and I am wondering what percentage of the working hours, of their colleagues, Yorke and Maplestone have saved by bringing together in condensed form this wealth of very technical information. In other words, have they made our lives, from now on, 5, 10, 15, or 20 per cent. more efficient?

The fourth thought is addressed to the unborn helminthologist :—

MY DEAR UNBORN COLLEAGUE :

When you consult this book, you will find in it some views with which you will not agree. This will be the inevitable result of an advance in knowledge after the publication of this volume. And as you differ with taxonomic views expressed here, so will your successors modify your views as their knowledge increases. These changes of view from generation to generation are inevitable unless Science stagnates.

This work by Yorke and Maplestone was written in order to save your time and to make you more efficient in your professional life. It has cost them many hours and days of patient labour. It has not been prepared in order to gain a reputation. It is a labour of love on their part in order to help you. See that you do for the generation which follows you, what Yorke and Maplestone have done for you.

CHARLES WARDELL STILES,  
*Professor of Zoology, U.S. Public Health  
Service.*

WASHINGTON, D. C.



## PREFACE

NOTWITHSTANDING the vast amount of work which has been done on the Nematode parasites of man and other vertebrate animals, it is remarkable that, since the time of Dujardin, Diesing, and Schneider, nobody has attempted to envisage the whole subject and bring together into a single volume an account of all the known Nematode parasites. In our work at the Liverpool School of Tropical Medicine, where we frequently have to deal with large collections of parasites, we have been forcibly impressed with the fact that the task of identification would be greatly simplified if we had at our disposal a volume of this nature. The literature on the subject is so enormous and so scattered that without the assistance of a large reference library even experts would find it almost impossible to place many nematodes in their proper genera, and for those who have no special knowledge of the subject the task is hopeless.

It was mainly with the object of simplifying the process of identifying Nematode parasites that we have undertaken this work. We have confined ourselves to a description and classification of the genera, not only because any attempt to deal with all the species would be a task far too great for the time at our disposal, but also because it is very doubtful whether, in view of the wholly inadequate description available of vast numbers of species, anything is to be gained by attempting so ambitious a work at the present moment. After the description of each genus we have, however, given a list of such species, together with their hosts, as can, with a reasonable degree of certainty, be ascribed to it. On further investigation it will probably be found that many of the species are merely synonyms, and it will of course be understood that no reference is made to large numbers of the earlier species, knowledge of which is not sufficient to permit of their classification.

In framing our generic definitions we have kept the type species prominently in mind and consequently in certain cases further knowledge will doubtless show that we have included points of merely specific value. Whilst in most cases we have illustrated



the genus by drawings of the type species, in a few instances we have been compelled to use other species for this purpose.

In preparing this work, we have been fortunate in possessing, in the Museum of the Liverpool School of Tropical Medicine, a very large and representative collection of Nematodes, and have so far as is possible relied for our illustrations and descriptions on personal observation, but it need hardly be mentioned that we have of necessity borrowed copiously from the work of others whose names are too numerous to mention. We cannot, however, refrain from paying special tribute to Stiles and Hassall's "Index Catalogue of Nematodes"—a truly indispensable volume and one without which it would have been impossible for us to have undertaken this work. Amongst other modern authors to whom we must express particular obligation are Railliet and Henry, Baylis, Hall, Lane, Leiper, Ransom, Seurat, Skrjabin, and Travassos. We are also specially indebted to Dr. J. W. Scott Macfie, and Mr. Noel Pillers for much assistance and material, and to Professor Stiles, who has kindly read the proofs of this volume, for much friendly criticism and many valuable suggestions.

At the end of the volume is a list of references which, although it represents only a small fraction of the total literature, is nevertheless of considerable length and mentions those papers which we have found of value for the purpose in view. In order to avoid constant repetition of references throughout the text, we have adopted the plan of numbering the list, which is arranged alphabetically, and of placing after each genus the numbers relating to the references which bear upon it.

We offer no apologies for the presentation of this work, as we are satisfied that it will prove useful to the expert as a book of reference, and to the novice as a reliable guide in his endeavour to allocate the various Nematode parasites to their respective genera.

W. Y.  
P. A. M.

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## INTRODUCTION

ZOOLOGISTS have apparently not yet reached agreement even upon the question of the primary subdivision of the animal kingdom, and the NEMATHELMINTHES have been variously accorded the rank of Class, Phylum, and Subkingdom. If we accept the view that the proper status of the group is that of a Phylum, then its main subdivisions, NEMATODA and ACANTHOCEPHALA, will be Classes. Study of the literature reveals a certain justification for this view. Rudolphi (1808) divided the round worms into two Orders: the NEMATOIDEA including the genera *Filaria*, *Hamularia*, *Trichocephalus*, *Oxyuris*, *Cucullanus*, *Ophiostoma*, *Ascaris*, *Strongylus* and *Liorhynchus*, to which in 1819, he added *Trichosoma*, *Spiroptera* and *Physaloptera*; and the ACANTHOCEPHALA including the genera *Echinorhynchus* and *Tetrarhynchus*, the second of which he transferred in 1819, to the CESTOIDEA.

Diesing (1861) in his "Revision der Nematoden" employs the same two Orders, except that he emends NEMATOIDEA to NEMATODA which he ascribes to Rudolphi. Accordingly, NEMATOIDEA and NEMATODA are absolute synonyms. The order NEMATODA as used by Diesing is however much more extensive than the Order NEMATOIDEA as employed by Rudolphi and includes in addition to many other genera, GORDIUS and MERMIS. Consequently, Diesing finds it necessary to divide the Order NEMATODA into two suborders, NEMATODA APROCTA containing *Gordius* and *Mermis*, and NEMATODA PROCTUCHA including the genera placed by Rudolphi in NEMATOIDEA together with many other allied genera. It is obvious therefore that Diesing's suborder NEMATODA PROCTUCHA corresponds to the Order NEMATOIDEA as employed by Rudolphi.

On account of its superfamily termination NEMATOIDEA is an unfortunate word, and we believe that we are justified in accepting Diesing's emendation. We therefore propose to raise the Orders NEMATODA Rudolphi, 1808, emend. Diesing, 1861, and ACANTHOCEPHALA Rudolphi, 1808, to the rank of Classes and to divide the former into two Orders corresponding to Diesing's NEMATODA APROCTA and NEMATODA PROCTUCHA. These are, however,

homonyms of *AFROCTA* Diesing, 1851, and *PROCTUCHA* Diesing, 1851, respectively, and cannot be used. For the former group the order *GORDIACEA* Siebold, 1848 (quoted in Carus, 1863) seems to be valid, and for the latter *EUNEMATODA* Ward, 1916.

When dealing with a large series of individuals which tend morphologically to merge gradually one into the other, it is obvious that no system of classification, which must of necessity be based on hard and fast characters, can be entirely satisfactory. Yet it is equally obvious that, for the identification of individuals, some system of classification is essential and must be attempted, however far the result falls short of idealism.

We have followed Railliet in dividing the nematode parasites of vertebrates into eight superfamilies. Railliet, however, gives no definition of the various superfamilies, but contents himself with enumerating the families and subfamilies they contain. The task of defining them is necessarily arbitrary, owing to the manner in which they tend to run one into the other (*e.g.*, the *SPIRUROIDEA* into the *FILARIOIDEA* and the *OXYUROIDEA* into the *ASCAROIDEA*), and we have found it a matter of very great difficulty.

In the past from the time of Schneider onwards, much importance from the point of view of classification has been attached to the character of the subcutaneous musculature. This character appears to us to be of rather doubtful taxonomic value, as it is not one which is very easily observed and nothing is recorded about it in respect of the great majority of species. Moreover, it cannot have a superfamily value, as otherwise such a well-defined superfamily as the *STRONGYLOIDEA* would require division, and the polymyarian *METASTRONGYLIDÆ* have to be separated from the meromyarian *TRICHOSTRONGYLIDÆ* and *STRONGYLIDÆ*. Moreover, the genus *Spiroxys*, which is typically meromyarian, would require to be removed from the superfamily *SPIRUROIDEA*, many of which are typically polymyarian. Further evidence indicating the difficulty of basing any classification on this character is found in such worms as *Cruzia tentaculata* (Rud., 1819) which Travassos, 1921, describes as being incompletely polymyarian; and finally Seurat (1920), in discussing the great importance in classification attributed by Schneider to myological characters, states that in reality these characters are not absolute and that the two types of structure can exist not only in forms belonging to the same genus, but also in the same species, *e.g.*, in *Falcaustra lambdiensis* Seurat, 1918, the subventral muscle fields exhibit one polymyarian sublateral area and one meromyarian sublateral area. We have, therefore, decided to ignore this character in our definitions and

to have recourse to characters which are more easily determined and more generally recorded.

The first superfamily RHABDIASOIDEA differs from all the others in that it is based on a biological character and not on particular morphological features. Railliet created the RHABDIASOIDEA to include all the heterogenetic parasitic nematodes. In these forms the parasitic stage is not differentiated into males and females, but is hermaphroditic or parthenogenetic, whilst the free-living stages may or may not exhibit sexual differentiation before reaching the infective stage. It might be noted here that Travassos (1919) has placed the ATRACTIDÆ in this superfamily, but as hardly anything is known of the life-history of these parasites, except that the parasitic forms are sexually differentiated, nothing seemed to be gained by following Travassos in this respect and we have preferred to leave them in the superfamily OXYUROIDEA.

As the superfamily name ANGIOSTOMOIDEA Hall, 1916, is still used by some modern writers, it seems desirable to point out that Dujardin placed in his genus *Angiostoma* two species, viz.—*A. entomelas* and *A. limacis*, the former of which is heterogenetic, but not the latter. The type of the genus has been decided both by designation and by absolute tautonymy (Stiles and Hassall, 1905) to be the non-heterogenetic form *A. limacis* from *Limax rufa*, and consequently *A. entomelas* and the heterogenetic forms which have been ascribed by various authors to the genus *Angiostoma* must be removed from it. In 1905, Stiles and Hassall erected the genus *Rhabdias* for the heterogenetic nematode *Ascaris bufonis* Schrank, 1788, found in the lung of the toad, and it is to this genus that *Angiostoma entomelas* Duj. now belongs (Seurat, 1916); the superfamily name of the heterogenetic group is consequently RHABDIASOIDEA and not ANGIOSTOMOIDEA.

With regard to the remaining seven superfamilies, an attempt must be made to define them on morphological characters and this is a somewhat arbitrary and difficult task.

The TRICHUROIDEA form a well-defined group based on the character of the œsophagus, which is peculiar in that it consists of a delicate membranous tube running in part of its length at least through the centre of a chain of single cells, thus giving an effilate appearance to the anterior (œsophageal) portion of the worms.

The worms belonging to this superfamily are divided into two families, viz., TRICHURIDÆ and TRICHINELLIDÆ, depending on whether or not the male possesses a spicule or copulatory sheath. The former family is conveniently subdivided into two sub-

families, viz., the TRICHURINÆ, in which the anterior (œsophageal) part of the body is longer and much more delicate than the posterior, and the CAPILLARIINÆ, in which the anterior (œsophageal) part of the body is not longer, and only slightly more delicate, than the posterior. We have decided to separate off the genus *Trichosomoides* from the second family TRICHINELLIDÆ, which is characterized by the absence of a spicule and a copulatory sheath, and to place it in a new family TRICHOSOMOIDIDÆ, because the two sexes are of very different sizes and during the greater part of its adult life the male is parasitic in the vagina or uterus of the female, and because they are parasites of the genito-urinary system. It is to be noted that Hall (1916) has already created for this nematode a subfamily TRICHOSOMOIDINÆ, which he placed in the TRICHINELLIDÆ.

There is some doubt regarding the correct name of this superfamily, since TRICHINELLOIDEA Hall, 1916, preceded TRICHUROIDEA Railliet, 1916. Hall based his superfamily on the family TRICHINELLIDÆ Ward, 1907, in which he places all the genera belonging to the superfamily, apparently not recognizing the family TRICHURIDÆ Railliet, 1915. As Railliet (1916) points out the genus *Trichuris*, based on the species *Ascaris trichiura* Linnæus, 1771, is undoubtedly the central genus of the superfamily, and Baird (1853) actually made a family TRICHOCEPHALIDÆ for the genus *Trichocephalus*, of which *Ascaria trichiura* Linnæus is the type. For these reasons it seems to us desirable to accept TRICHUROIDEA as the superfamily name.

The STRONGYLOIDEA form another well-defined superfamily characterized by the presence in the male of a cuticular bursa copulatrix. This is a cuticular formation completely surrounding the posterior extremity of the worm on its dorsal and lateral surfaces and sometimes also on the ventral surface, not extending forwards along the body laterally, but prolonged beyond the posterior extremity which it encloses. It consists typically of two lateral lobes united dorsally by a dorsal lobe, but the latter is frequently small or even undefined, and sometimes the lateral lobes are united ventrally by a special ventral lobe or lobes. It is supported by prolongations of subcuticular substance known as rays. The term bursa is sometimes used in referring to the lateral cuticular expansions (caudal alæ) seen on the tails of many of the OXYUROIDEA, SPIUROIDEA, and FILARIOIDEA, e.g., in the genus *Physaloptera*, but it is better limited to the terminal cuticular formation seen in the STRONGYLOIDEA.

The numerous nematodes constituting the superfamily

STRONGYLOIDEA can conveniently be divided into two groups according to whether they are parasites of the alimentary canal or of the respiratory system, and those belonging to each group can again be subdivided on the character of the buccal cavity. It is upon these points that the various families are separated one from the other. Railliet (1916) considers that the bursate nematodes found in the alimentary canal should be divided into two families only, TRICHOSTRONGYLIDÆ and STRONGYLIDÆ. Whilst we have accepted the first of these in the sense in which it is employed by Railliet, *i.e.*, for all the strongyl parasites of the alimentary canal in which the buccal capsule is rudimentary or absent, we agree with Lane (1917) and others that it is desirable to limit the definition of the STRONGYLIDÆ, and to separate off from them into other families those worms in which the oral margin of the buccal capsule is armed by ventral teeth or cutting plates—ANCYLOSTOMIDÆ, and those in which the buccal capsule is definitely bivalvular and of a complex character—DIAPHANOCEPHALIDÆ.

The division of the family STRONGYLIDÆ into subfamilies is very necessary on account of the numerous and widely different genera it contains. The procedure is, however, a matter of great difficulty whether it is based on cephalic or on bursal characters. Railliet and Henry maintain that the form and disposition of the buccal capsule are secondary adaptations, and are consequently of less importance in classification than variations in the sexual apparatus; they therefore have divided up the family into subfamilies on bursal characters, and on certain female characters, *e.g.*, the position of the vulva, and the direction of the uterine tubes. Lane (1917) has clearly shown there are numerous objections to this scheme of classification; and, indeed, the more one puts it to the test the more unsatisfactory does it appear. In our definitions of Railliet's subfamilies STRONGYLINÆ, TRICHONEMINÆ, and ŒSOPHAGOSTOMINÆ, we have therefore relied entirely on cephalic characters, and have completely ignored the sexual characters. The definitions given are admittedly somewhat arbitrary and even unsatisfactory, but we are convinced that such a procedure gives rise to fewer difficulties, and to less ambiguity due to differences of interpretation depending on the personal element, than any attempt to base the definitions on sexual characters. Emphasis of the transverse ventral cervical groove as the essential character of the ŒSOPHAGOSTOMINÆ may at first sight appear unfortunate, as it necessitates the grouping together of genera with the buccal capsule so widely different as those



exhibited by *Æsophagostomum* and *Chabertia*; but if we exclude bursal characters, there appears to be nothing left on which to base a definition; whereas if we do not exclude bursal characters, then we must range in the subfamily some four or five genera from marsupials, all of which exhibit a bursal formula similar to *Æsophagostomum*, but have widely different cephalic characters, and none of which possesses a transverse ventral cervical groove. Strict adherence to the above definitions has of course necessitated some reshuffling of the genera and the transference of such genera as *Æsophagodontus*, *Triodontophorus*, and *Craterostomum* from the TRICHONEMINÆ to the STRONGYLINÆ. The creation of a special subfamily KILULUMINÆ Thapar, 1923, for the genus *Kiluluma* appears to us to be unnecessary and undesirable. For the genus *Stephanurus*, which is met with in renal and perirenal tissue, Railliet, Henry, and Bauche (1919) created the subfamily STEPHANURINÆ, which is placed in the STRONGYLIDÆ.

The ANCYLOSTOMIDÆ are divided, as suggested by Lane (1917), into the subfamilies ANCYLOSTOMINÆ and NECATORINÆ, according to whether the ventral cutting organs on the oral margin of the buccal capsule are teeth or plates. We adhere to the name NECATORINÆ, although it is preceded by BUNOSTOMINÆ Looss, 1911, on account of the considerable discussion which still continues concerning the status of the generic name *Bunostomum*. More recently Lane (1923) has created a third subfamily AGRIOSTOMINÆ for the genus *Agriostomum*, but we have been unable to discover any particular advantage for this. For the genus *Strongylacantha* we have found it necessary, on account of its peculiar buccal armature, to erect a new subfamily STRONGYLACANTHINÆ, which we have with some diffidence placed in the ANCYLOSTOMIDÆ, although possibly it should be referred to the TRICHOSTRONGYLIDÆ.

Railliet (1916) has created the subfamily DELETROCEPHALINÆ for the genera *Deletrocephalus* and *Codiosostomum*, which are parasites of birds, and to this subfamily Baylis and Daubney (1922) have referred tentatively the genus *Diaphanocephalus*. The genus *Deletrocephalus* requires re-investigation, and *Codiosostomum*, which we have had the opportunity of studying, undoubtedly resembles very closely the genus *Strongylus*, and we have therefore transferred it to the STRONGYLINÆ. For these reasons we have adopted the family DIAPHANOCEPHALIDÆ Travassos, 1919, to include the bursate nematodes with a bivalvular buccal capsule, parasitic in reptiles, and we have left unplaced, pending further investigation, the genus *Deletrocephalus*, which is found in the American ostrich.

In subdividing the family TRICHOSTRONGYLIDÆ, it is con-

venient, as Travassos (1914) has suggested, to unite into one subfamily HELIGMOSOMINÆ Travassos, 1914, all those genera with a single set of female genitalia ; and to divide the remainder into two other subfamilies TRICHOSTRONGYLINÆ Leiper, 1908, and AMIDOSTOMINÆ Travassos, 1919, according to whether the buccal capsule is absent or rudimentary, or whether it is relatively well-developed ; the last group, AMIDOSTOMINÆ, obviously occupies an intermediate position between the STRONGYLIDÆ and the TRICHOSTRONGYLIDÆ.

On studying the TRICHOSTRONGYLIDÆ as a whole, and more especially the TRICHOSTRONGYLINÆ, one cannot but be impressed with the almost ludicrous extent to which minute differences in the bursal formula have been made a pretext for the erection of new genera, and in view of the variations in minor detail of the bursal formula, which are now known to be exhibited by certain species of the STRONGYLOIDEA, it does not seem unlikely that further knowledge will necessitate the sinking of many of the genera of this subfamily. A somewhat similar state of things is seen in the TRICHONEMINÆ, where we ourselves have found it necessary to sink a number of genera, the sole claim for existence of which depended on minutiae of the bursal formula, which we are satisfied in certain cases is hardly even of specific value.

The bursate nematodes in the respiratory system are similarly divided into two families, viz., SYNGAMIDÆ, in which there is a well-developed chitinous buccal capsule, and METASTRONGYLIDÆ, in which the buccal capsule is rudimentary or absent. Both these families are small and they do not require further subdivision into subfamilies. The hitherto incompletely known genera *Pseudalius*, *Stenurus*, and *Prosthecosacter*, parasitic in the respiratory system of marine mammals, have recently been re-investigated by Baylis and Daubney (1925). Although these authors have placed these genera in the METASTRONGYLIDÆ, we have, on account of the rudimentary development of the bursa, followed Railliet in grouping them in a family PSEUDALIIDÆ.

The superfamily DIOCTOPHYMOIDEA, characterized by the presence in the male of a bell-shaped muscular copulatory bursa, is a small group and contains but a single family.

Considerable difficulty is involved in separating the next two superfamilies, viz., OXYUROIDEA and ASCAROIDEA. Railliet considers that the essential distinction between the two is that the first is meromyarian and the second polymyarian. We have, however, already referred to certain objections to emphasizing this character in classification and also to the fact that it cannot be regarded as of superfamily value ; and we prefer therefore to

follow Travassos (1920) in regarding the presence of a posterior bulb in the œsophagus as the essential characteristic of the superfamily OXYUROIDEA. The adoption of this definition of the OXYUROIDEA has necessitated the removal of the genus *Ascaridia* from the family HETERAKIDÆ, and the transference of the rest of this family from the ASCAROIDEA to the OXYUROIDEA. It must be confessed, however, that we have not been absolutely consistent in regard to the above definition of the OXYUROIDEA: the genus *Dujardinia*, although it possesses a definite œsophageal bulb, resembles so closely the ANISAKINÆ in other respects, that we have been compelled to leave it in this subfamily of the ASCAROIDEA. Moreover, certain of the ATRACTIDÆ, which we have placed in the OXYUROIDEA, exhibit but a very ill-defined bulb at the posterior end of the œsophagus, but taking the family as a whole, there seems to us to be no reasonable ground for not including it in the OXYUROIDEA. With these qualifications, however, we have adhered strictly to the conception that the presence of a posterior œsophageal bulb is the essential character of the superfamily OXYUROIDEA.

In considering the primary divisions of the OXYUROIDEA, it appears reasonable to divide them into two groups, the first including those forms which possess single female genitalia, and the second including those which possess double female genitalia. For the first group Travassos (1919) has erected the family ATRACTIDÆ. With regard to the second group, which comprises the great majority of the worms belonging to the superfamily, we consider there is ample precedent for adopting the family CRUZIIDÆ erected by Travassos (1917) for the genus *Cruzia*, on the ground that it exhibits an intestinal diverticulum; and we have separated the remainder into the OXYURIDÆ Cobbold, 1864, in which there is no special development of the precloacal musculature, and into three other families, viz., HETERAKIDÆ, SUBULURIDÆ, and KATHLANIIDÆ, in which the precloacal musculature is strongly developed—usually in the form of a sucker or pseudo-sucker.

We have felt it desirable to separate the genus *Subulura* and its allied genera from the HETERAKIDÆ, and to erect for them a new family SUBULURIDÆ, owing to the absence in the latter worms of the three large lips characteristic of the HETERAKIDÆ, the presence of a definite cylindrical vestibule armed with teeth at its base, and the more feeble development of its precloacal sucker, which is neither circular nor surrounded by a chitinous rim as in the HETERAKIDÆ. The family KATHLANIIDÆ Travassos, 1918,

seems to occupy an intermediate position between the HETERAKIDÆ and the SUBULURIDÆ. It is characterized by the presence of three definite lips, by a vestibule, and usually by a sucker without a chitinous rim, although occasionally there may be no definite sucker but merely a strongly-developed precloacal musculature; finally, the œsophageal bulb is usually preceded by a definite swelling so that the end of the œsophagus presents the appearance of an hour-glass.

In dealing with the very large family OXYURIDÆ, we have followed Railliet and Henry in dividing it into four subfamilies, according to the presence of one or two spicules and to the presence or absence of a gubernaculum; and similarly we have divided the ATTRACTIDÆ into three subfamilies on the same characters.

Whilst this procedure may be zoologically sound, and is certainly useful failing other more pronounced characters exhibited by both sexes, it is in practice very unsatisfactory, because the classification is based on the characters of the sex, which in the case of worms belonging to this family, is notoriously the more difficult to find; and indeed in a large number of species now placed in the genus *Oxyuris* *s.l.*, the male is still unknown. Nothing appears to us to be gained by accepting the family PHARYNGODONIDÆ which Travassos (1919) has erected for the genera *Pharyngodon*, *Thelandros*, and *Tachygonetria*.

As we have removed the SUBULURINÆ from the HETERAKIDÆ, this family now contains but a single subfamily, the HETERAKINÆ. We have placed the genus *Hoplodontophorus* made by Turner (1921) for the species *Oxyuris flagellum* Hemprich and Ehrenberg, 1828, in the family SUBULURIDÆ, but as it presents several well-marked differences from the other members of this family, we have thought it desirable to create for it a new subfamily HOPLODONTOPHORINÆ. The genus *Cissophyllus* Railliet and Henry, 1912, appears to us to be more closely allied to the KATHLANIDÆ than to the SUBULURIDÆ, and we have therefore placed it in that family, but in a new subfamily CISSOPHYLLINÆ.

Having eliminated the OXYUROIDEA, the definition of the superfamily ASCAROIDEA becomes a comparatively simple matter and we have restricted it to contain only those nematodes which possess three large lips, and do not exhibit a bulb at the posterior end of the œsophagus. This definition excludes the genera *Camallanus* and *Cucullanus* and their allied forms from this superfamily where Railliet has tentatively placed them. Both these genera are characterized by the bilateral symmetry of the mouth, and for this reason we have referred them to the SPIRUROIDEA.

As regards *Camallanus* the character of the œsophagus affords strong support for this procedure, but in *Cucullanus* the structure of this organ resembles more that found in the ASCAROIDEA.

We have followed Railliet and Henry in dividing the ASCAROIDEA into two families: ASCARIDÆ, in which the alimentary canal is simple; and HETEROCHEILIDÆ, in which it is not simple, but exhibits œsophageal, or intestinal, diverticula or cæca, or a post-œsophageal ventriculus. We have divided the ASCARIDÆ into two subfamilies, ASCARINÆ and ASCARIDIINÆ, depending on the absence or presence of a precloacal sucker. As regards the second family, we agree with Baylis that it is better to limit the subfamily HETEROCHEILINÆ Railliet and Henry, 1912, to include only the genera *Heterocheilus* and *Typhlophorus*, to place the genus *Gæzia* and the genus *Crossophorus* in special subfamilies GÆZIINÆ (Travassos, 1919) Baylis, 1920, and CROSSOPHORINÆ Baylis, 1920, and to group all the remaining genera which do not exhibit any special cuticular characters in the subfamily ANISAKINÆ Railliet and Henry, 1912.

Whilst the two remaining superfamilies, viz., SPIRUROIDEA and FILARIOIDEA, are clearly separated from the previous superfamilies, it is by no means easy to draw a sharp line of demarcation between them, and both can be generally described as slender and filiform with a long slender œsophagus. The SPIRUROIDEA possess, as a rule, two lateral lips, they usually exhibit a chitinous buccal capsule or vestibule, so that the œsophagus does not approach the anterior extremity of the worm, and the vulva is usually situated in the middle of the body or posterior to it; in the FILARIOIDEA the mouth is usually simple and without lips, the buccal cavity or vestibule is absent or rudimentary, so that the œsophagus approaches closely to the anterior extremity, and the vulva is almost invariably in, or close to, the œsophageal region of the body. Whilst these morphological distinctions suffice to separate the two superfamilies in the vast majority of instances, there are undoubtedly forms which appear to occupy an intermediate position, and to our mind the essential difference between the two is that whilst the SPIRUROIDEA are parasites of the alimentary canal, of the respiratory system, or of the oral or nasal cavities, the FILARIOIDEA are tissue parasites. The question is one of very great difficulty and it is only by carefully considering morphological characters in conjunction with the site in which the parasite is found, that it is possible in some instances to reach a conclusion regarding the superfamily in which the worm should be classified.

In attempting to define the numerous families comprising the SPIRUROIDEA we have attached particular importance to the formation of the head, and to the presence of special cuticular structures such as cordons or spines. The TETRAMERIDÆ Travassos, 1914, form a well-defined family for those SPIRUROIDEA exhibiting marked sexual dimorphism. We have grouped together all those forms which are provided with prominent cephalic appendages into the family ANCYRACANTHIDÆ Railliet, 1916, and this, as will be referred to later, has necessitated the transference of a considerable number of genera previously placed in other families. The family HEDRURIDÆ Railliet, 1916, contains only the genus *Hedruris* which is characterized by its four highly specialized lips, and by the peculiar fixation organ on the tail of the female. We have limited the family CAMALLANIDÆ Railliet and Henry, 1915, to those forms which possess a large chitinous buccal capsule; and we have accepted the family CUCULLANIDÆ Cobbold, 1864, for those worms in which the head consists of two large lateral lips and the œsophagus is dilated anteriorly to form a pseudo-buccal capsule.

It appears to us desirable to limit the family ACUARIIDÆ Seurat, 1913, to include only those SPIRUROIDEA which exhibit cuticular cordons, and to separate off into the family PHYSALOPTERIDÆ Leiper, 1908, those which, while they resemble the ACUARIIDÆ in possessing large simple lateral lips, do not exhibit cuticular cordons, but are usually provided with a cuticular collarette. We have accepted with some slight modification the definition of GNATHOSTOMIDÆ Railliet, 1895, given by Baylis and Lane (1920); but, while we regard the peculiar formation of the lips as one of the chief features of this family, it seems to us to be simpler to consider the presence of a cuticular head bulb as the essential character, and for this reason we have removed the genus *Spiroxys* from this family and placed it with the forms exhibiting somewhat similar lips, e.g., *Hartertia* and *Protospirura*, in the family SPIRURIDÆ. We have extended the family RICTULARIIDÆ to include all the SPIRUROIDEA which do not possess cordons, but are armed with chitinous hook-like spines arranged in longitudinal rows or circles along the whole, or anterior portions, of the body. The family SEURATIDÆ was made by Railliet (1916) to include the genus *Seuratum*, which is peculiar in possessing a short entirely muscular œsophagus and in exhibiting longitudinal dark bands on the cuticle. The remaining families, SPIRURIDÆ Oerley, 1885, and THELAZIIDÆ Railliet, 1916, are based more or less on negative characters. Railliet, who erected the family THELAZIIDÆ,

placed in it eight genera and gave a long definition which contains, however, only a single definite point, viz., that the tail of the male is provided on each side with a linear row of numerous preanal papillæ. He includes in the family, forms with cephalic appendages and forms without cephalic appendages, forms with caudal alæ in the male and forms without caudal alæ, and forms from such widely different sites as the orbital regions of mammals and birds and the alimentary canal and air vessels of birds and fishes. Railliet's definition of the family is therefore not entirely satisfactory, the more especially as when we turn to the genus *Oxyspirura*, which is included in the family, we find that the number of preanal papillæ varies from two to twenty-eight. In view of the somewhat ill-defined nature of this family, it appears to us better to remove from it those genera which are provided with cephalic appendages and to place them in a subfamily SCHISTOROPHINÆ Travassos, 1918, which we refer to the family ANCYRACANTHIDÆ. While the general distinction between the SPIRURIDÆ and the THELAZIIDÆ, viz., that in the former the male is always provided with caudal alæ supported by four pairs (rarely five or six) of pedunculated preanal papillæ, and in the latter the male is usually without caudal alæ and the preanal papillæ are sessile and numerous, undoubtedly holds good in the great majority of cases, yet it is not entirely satisfactory.

Most of the above mentioned families are small and contain but a limited number of genera and in only three cases is it necessary to subdivide the families by the formation of two or more subfamilies. As we have enlarged the family ANCYRACANTHIDÆ by the introduction of the subfamily SCHISTOROPHINÆ, into which we have placed seven genera removed from the THELAZIIDÆ and other families on account of their cephalic ornamentation, it became necessary to erect a new subfamily ANCYRACANTHINÆ for the genus *Ancyracanthus*, the most striking feature of which is its possession of four remarkable feathered processes arising from the head and directed outwards and backwards. We have subdivided the CUCULLANIDÆ into two new subfamilies, CUCULLANINÆ, for the genus *Cucullanus* and other allied forms without an intestinal cæcum and with two ovaries, and DACNITOIDINÆ, for the genus *Dacnitoides* Ward and Magath, 1916, which possesses an intestinal cæcum and only one ovary. Finally, the family SPIRURIDÆ is divided into the subfamilies, SPIRURINÆ Railliet, 1915, SPIROXYNÆ Bøylis and Løne, 1920, ARDUENNINÆ Railliet and Henry, 1911, and GONGYLOMINÆ Hall, 1916, according to the characters of the lips and vestibule,

and whether or not the anterior portion of the body is ornamented with cuticular plaques.

The FILARIOIDEA are divided into two families, viz., FILARIOIDÆ (Cobbold, 1864) Claus, 1885, in which the females are not enormously longer than the males and the vulva does not atrophy in the gravid worm, and DRACUNCULIDÆ Leiper, 1912, in which the female is enormously larger than the male and the vulva is atrophied in the gravid worm. Whilst the latter family contains only a couple of genera, the former is very large and contains numerous genera.

Up to the present the FILARIOIDÆ have been divided into four subfamilies: FILARIOINÆ Stiles, 1907, ONCHOCERCINÆ Leiper, 1911, DIPLOTRIÆNINÆ Skrjabin, 1916, and MICROPLEURINÆ Baylis and Daubney, 1922. The researches of Seurat, Skrjabin, and others during the past few years have, however, revealed the necessity for the creation of many new genera of filariid worms; and in attempting to classify the numerous genera now recognized, we have found it necessary to limit the scope of the existing subfamilies which, with the exception of DIPLOTRIÆNINÆ Skrjabin, 1916, have not been defined, and to erect a number of others. Turning to *Filaria martis* Gmelin, 1790, which is the type species upon which the whole family is based, we find that the most striking characters are the simple mouth bounded by minute lips, the smooth cuticle without bosses or annular thickenings, the unequal and dissimilar spicules in the male, and the anterior position of the vulva in the female. We have therefore limited the subfamily FILARIOINÆ to include FILARIOIDÆ with these characters. A second group only differing from the above by the fact that the spicules are equal, or subequal and similar, we have united into a new subfamily APROCTINÆ. We have considered the existence of annular cuticular thickenings as characteristic of the subfamily ONCHOCERCINÆ Leiper, 1911, and similarly have erected a new subfamily LOAINÆ for those FILARIOIDÆ which exhibit cuticular bosses. Skrjabin regards the presence of chitinous formations, exhibiting a tendency to divide into three portions, on each side of the head—situated either superficially on the cuticle, or in the interior of the body beside the œsophagus—as the essential character of his subfamily DIPLOTRIÆNINÆ; he includes in the subfamily the genera *Diplotriæna* Railliet and Henry, 1909, *Serratospiculum* Skrjabin, 1916, and *Contortospiculum* Skrjabin, 1916. We have carefully examined these genera, and also a number of allied forms, and have reached the conclusion, that the trident-like structures embedded in the body



on each side of the anterior end of the œsophagus in *Diplotriæna* are so characteristic and essentially different from the superficial epaulette-like formations existing in *Serratospiculum* and *Contortospiculum*, that it is better to limit the subfamily DIPLOTRIÆNINÆ to the genus *Diplotriæna*. We have consequently removed the other two genera to a new subfamily SETARIINÆ, characterized by the fact that the mouth is surrounded by a chitinous ring, by lateral epaulette-like structures, or by small spinous teeth.

Baylis and Daubney (1922) mention a number of characters, viz., opposed uteri, vulva placed far back from the head, short ovaries, and equal spicules, as characteristic of *Micropleura*, and suggest on these grounds that it is justifiable to regard it as the type of a new subfamily MICROPLEURINÆ. On considering the FILARIIDÆ as a whole, however, we find that the position of the vulva is the only one of these characters which can be regarded as peculiar to *Micropleura*, and hence this feature must be regarded as the essential character of the subfamily. For a similar reason, we have erected a new subfamily CRASSICAUDINÆ for the genus *Crassicauda*, which is remarkable in that the vulva is situated near the posterior extremity.

It is, of course, obvious that although the family, subfamily, and generic names are ascribed to the author who first used them, the sense in which they were first used has been frequently modified by subsequent writers, and we ourselves have freely emended definitions wherever we considered it to be desirable. No reference to such emendations has been made in the text, as to have done so would have greatly complicated matters without serving any useful purpose.

### **Phylum NEMATHELMINTHES Vogt [Quoted by Carus, 1863].**

*Definition.*—Unsegmented animals, without appendages arranged on a regularly segmental plan; usually elongated, cylindrical, or filiform; with a body cavity in which the organs float: sexes usually separate, but some forms are hermaphroditic.

CLASS I.—*Nematoda* Rudolphi, 1808, emend. Diesing, 1861. *Nemathelminthes*; with a gut, but without a proboscis.

CLASS II.—*Acanthocephala* Rudolphi, 1808. *Nemathelminthes*; without a gut, but with a proboscis usually protrusible and almost invariably furnished with hooks.

CLASS NEMATODA Rudolphi, 1808, emend. Diesing, 1861.

ORDER 1.—*Eunematoda* Ward, 1916. *Nematoda* ; in which the body cavity is not lined by epithelium, the gonads being continuous with their ducts. Occasionally the posterior portion of the alimentary canal may atrophy in the sexually mature worms. Lateral chords present ; cloaca absent in the female.

ORDER 2.—*Gordiacea* Siebold, 1848 (quoted by Carus, 1863). *Nematoda* ; in which the body cavity is lined by epithelium ; the gonads are not continuous with their ducts, the ova being discharged into the body cavity and then passing into the ducts. In sexually mature worms the alimentary canal is atrophied. Lateral chords absent ; cloaca present in the female.

### Order EUNEMATODA Ward, 1916.

#### KEY TO SUPERFAMILIES.

1. Heterogenetic, parasitic form parthenogenetic . . . . . Rhabdiasoidea, p. 16.  
     Not heterogenetic, parasitic forms sexually differentiated . . . . . 2
2. Œsophagus consisting of a narrow tube running through the centre of a row of single cells for most of its length . . . . . Trichuroidea, p. 20.  
     Œsophagus not consisting of a narrow tube running through the centre of a row of single cells . . . . . 3
3. Males with a bursa copulatrix . . . . . 4  
     Males without a bursa copulatrix . . . . . 5
4. Bursa copulatrix cuticular and supported by rays . . . . . Strongyloidea, p. 33  
     Bursa copulatrix muscular and not supported by rays . . . . . Dioctophymoidea, p. 176.
5. Œsophagus dilated posteriorly into a bulb usually containing a denticular apparatus and frequently separated from the rest of the Œsophagus by a constriction . . . . . Oxyuroidea, p. 181.  
     Œsophagus not dilated posteriorly into a bulb . . . . . 6

6. Head with three large lobes or lips : relatively stout worms . . . . . *Ascaroidea*, p. 254.  
 Head without three large lobes or lips but with two lateral lips, or 4 or 6 small lips, or lips absent ; relatively slender filiform worms . . . . . 7
7. Usually with two lateral lips, chitinous buccal cavity or vestibule usually present, vulva usually in the middle of the body or posterior to it ; parasites of alimentary canal, respiratory system, or orbital nasal or oral cavities . . . . . *Spiruroidea*, p. 288  
 Usually without lips, buccal cavity or vestibule absent or rudimentary, vulva almost invariably in the oesophageal region ; parasites of circulatory or lymphatic systems, or muscular, or connective, tissue, or of serous cavities . . . . . *Filarioidea*, p. 387.  
 Genera of uncertain position, p. 443.

### Superfamily RHABDIASOIDEA Railliet, 1916.

Syn., *Angiostomoidea* Hall, 1916.

*Definition*.—EUNEMATODA : parasitic forms not differentiated into males and females but hermaphroditic or parthenogenetic ; the free living forms may or may not exhibit sexual differentiation before reaching the infective stage.

### FAMILY RHABDIASIDÆ RAILLIET, 1915.

Syn., *Angiostomidæ* Braun, 1895, in part.

*Definition*.—With the characters of the superfamily.

#### KEY TO GENERA.

- Parasitic form : vestibule present, oesophagus short, vulva near middle of body . . . . . *Rhabdias*, p. 17.  
 Parasitic form : vestibule absent, oesophagus long, vulva in posterior part of body . . . . . *Strongyloides*, p. 18.

Genus **RHABDIAS** Stiles and Hassall, 1905.

Syn., *Rhabdonema* Leuckart, 1879, preoccupied.

*Angiostoma* Dujardin, 1845, in part.

*Leptodera* Schneider, 1866, in part, not Dujardin, 1845.

*Definition.*—**RHABDIASIDÆ**: Parasitic form.—Mouth surrounded by six insignificant lips; sometimes with lateral flanges which are broader anteriorly than posteriorly; vestibule short and broad; œsophagus short, exhibiting sometimes a differentiation into two parts, and ending in a club-shaped swelling posteriorly. Posterior extremity tapers rapidly behind the anus and ends in a finely conical point; vulva near the middle of the body; uteri divergent and ending in a receptaculum seminis, shortly after

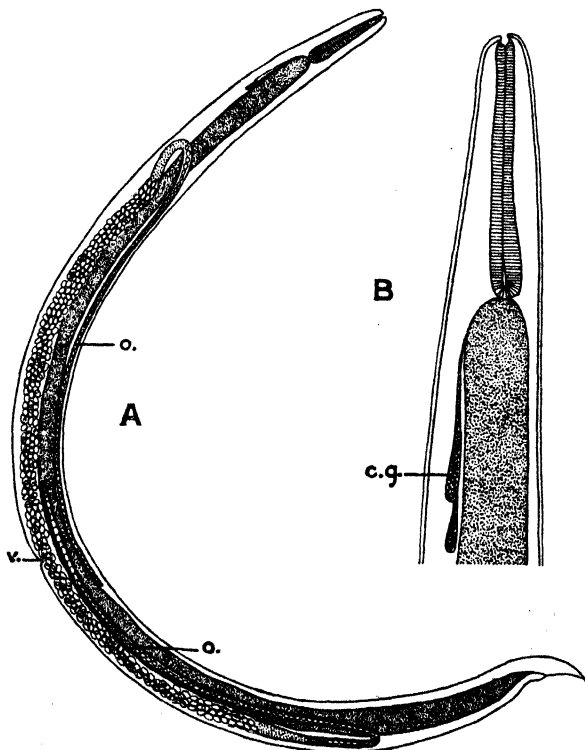


Fig. 1.—*Rhabdias bufonis*. A. Parasitic form, whole worm. o, ovary; v, vulva.  $\times 18$ . B. Parasitic form, anterior extremity. c.g, cervical glands.  $\times 50$ . (Orig.)

which the oviducts bend sharply back towards the middle of the body. Oviparous, eggs with a thin shell and containing

either a fully-developed larva or a morula at deposition. Parasites of the lungs of amphibia and reptiles.

Outside the host the larvæ may develop directly into the infective stage or pass first through a sexual generation. The infective larvæ are sheathed, have a short cylindrical vestibule, and the œsophagus has two swellings.

Type species: *R. bufonis* (Schränk, 1788). 11–13 mm. In *Rana* sp., *Bufo* sp.

Syn., *Ascaris bufonis* Schränk, 1788, not Gmelin, 1790.

*Ascaris nigrovenosa* Gœze, 1800.

*Rhabdonema nigrovenosum* (Gœze, 1800) Leuckart, 1879.

*Angiostomum nigrovenosum* (Gœze, 1800) Linstow, 1882.

*Leptodera nigrovenosa* (Gœze, 1800) Schneider 1866.

Other species:

*R. chamæleonis* (Skrjabin, 1916). In *Chamæleon* sp.

*R. dujardini* (Maupas, in Seurat, 1916). In *Anguis fragilis*.

*R. entomelas* (Duj., 1845). In *Anguis fragilis*.

Syn., *Angiostoma entomelas* Duj., 1845.

*Angiostoma macrostoma* Linstow, 1875.

*R. fuscovenosa* (Railliet, 1899). In *Tropidonotus natrix*.

*R. ophidia* Goodey, 1924. In *Coluber* sp.

*R. rotundata* (Linstow, 1906). In *Bufo viridis*.

*R. rubrovenosa* (Schneider, 1866). In *Bufo* spp., *Pelobates* sp.

*R. sphærocephala* Goodey, 1924. In *Bufo vulgaris*.

Refs. 131, 145, 186, 187, 190, 195, 304, 332, 400, 480, 481, 535, 557, 599.

Genus **STRONGYLOIDES** Grassi, 1879.

Syn., *Pseudorhabditis* Perroncito, 1880.

*Stercoralis* Tanaka, 1910.

**Definition.**—RHABDIASIDÆ: Parasitic form.—Body attenuated anteriorly, mouth with three small lips opening directly into a very long almost cylindrical œsophagus; anus shortly in front of the pointed posterior extremity; vulva in the posterior third of the body; uteri divergent continued as the oviducts which eventually turn backwards and run towards the middle of the body as the ovaries. Oviparous, eggs containing larvæ at deposition. Parasites of the intestine of mammals.

Outside the host the larvæ may develop directly into the infective stage or pass first through a sexual generation. The infective larvæ are unsheathed, have a short cylindrical vestibule, and the œsophagus is long and almost cylindrical; the tail ends

in two small points. Free-living sexual forms.—Mouth with three very small lips, vestibule short and cylindrical; œsophagus with two swellings separated by a constricted portion surrounded by the nerve ring, the anterior elongate and the posterior pear-shaped and containing a valvular apparatus; anus a little distance in front of the pointed posterior extremity. Male: posterior

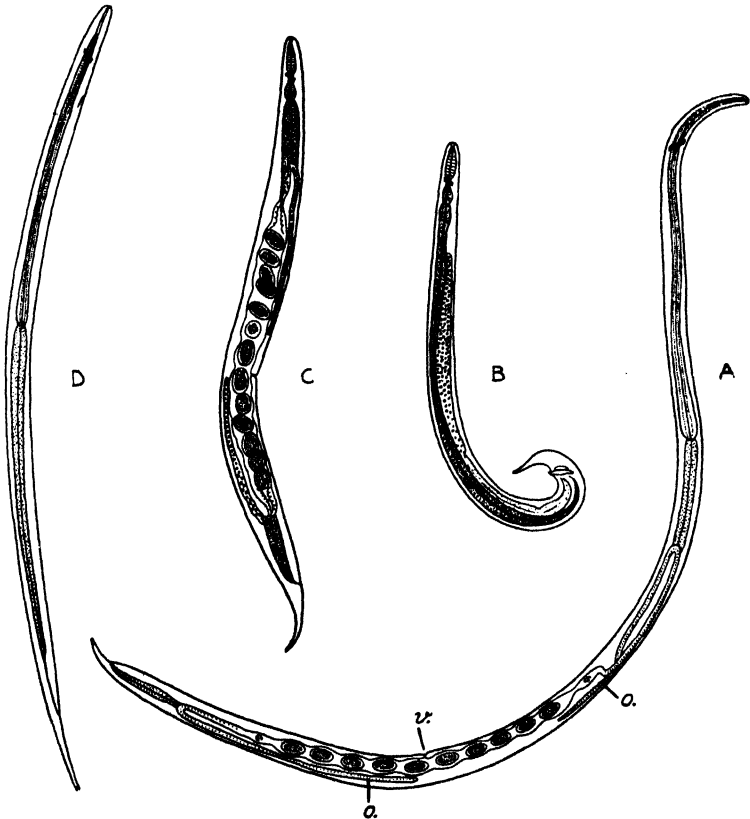


Fig. 2.—*Strongyloides stercoralis*. A. Parasitic form. o, ovary; v, vulva.  $\times 90$ . B. Free-living male.  $\times 90$ . C. Free-living female.  $\times 90$ . D. Infective larva.  $\times 215$ . (Orig.)

extremity bent; spicules short and equal; gubernaculum present; a few preanal papillæ. Female: posterior extremity tapering to a point; vulva near the middle of the body; uteri divergent. Usually oviparous, sometimes viviparous, eggs contain larvæ when deposited.

Type species: *S. stercoralis* (Bavay, 1876). In man. Parasitic form 2.2 mm. Free-living form ♂ 0.7 mm., ♀ 1.5 mm.

Syn., *Anguillula stercoralis* Bavay, 1876.

*Anguillula intestinalis* Bavay, 1877, not Ehrenb., 1838.

*Leptodera intestinalis* (Bavay, 1877) Cobbold, 1879.

*Pseudorhabditis intestinalis* (Bavay, 1877) Perroncito, 1881.

*Rhabdonema strongyloides* Leuckart, 1883.

*Rhabdonema intestinale* (Bavay, 1877) R. Bl. 1888.

Other species :

† *S. canis* Brumpt, 1922. In the dog.

\* *S. cebus* Darling, 1911. In *Cebus* sp.

\* *S. fülleborni* Linstow, 1905. In *Anthropopithecus* sp.

† *S. nasua* Darling, 1911. In *Nasua* sp.

\* *S. ovocinctus* Ransom, 1911. In *Antilocapra americana*.

*S. papillosus* (Wedl, 1856) Ransom, 1911. In *Capra* sp.,  
*Lepus* sp., *Ovis* sp., etc.

Syn., *Rhabdonema longum* (Grassi and Segré, 1885).

\* *S. Simiæ* Hung See Lu and Höppli, 1923. In macaques.

\* *S. suis* (Lutz, 1894) Linstow, 1905. In ox, pig, rabbit.

*S. vituli* Brumpt, 1921. In cattle.

*S. westeri* Ihle, 1917. In *Equus caballus*.

Refs. 77b, 78, 90a, 200, 219, 342, 344, 375, 389.

### Superfamily TRICHUROIDEA Railliet, 1916.

Syn., *Trichinelloidea* Hall, 1916.

*Definition*.—EUNEMATODA : anterior portion of body filiform, the œsophagus consisting of a delicate tube running, in part of its length at least, through the centre of a chain of single cells. Male : spicule single or absent. Female : one ovary.

#### KEY TO FAMILIES.

1. Males with a spicule or copulatory sheath . . . . . Trichuridæ, p. 21.
- Males without a spicule or copulatory sheath . . . . . 2
2. Males parasitic in uterus of female :
  - parasites of urinary system . . . . . Trichosomoididæ, p. 31.
  - Males not parasitic in uterus of female : parasites of gut . . . . . Trichinellidæ, p. 32.

\* Chandler (1925) considers these worms varieties or subspecies of *papillosus*, and those marked † varieties of *Stercoralis*.

## FAMILY TRICHURIDÆ RAILLIET, 1915.

Syn., *Trichocephalidæ* Baird, 1853.*Trichosomidæ* Leiper, 1912.

*Definition.*—TRICHUROIDEA: medium to large worms; the anterior (œsophageal) part of the body may be longer or shorter than the posterior; posterior part of the body may be much thicker than the anterior or only slightly thicker; mouth simple, lips inconspicuous or absent. Male: spicule single, or rarely with only a copulatory sheath. Female: vulva near termination of œsophagus. Oviparous, eggs with a thick shell, barrel-shaped, with plugs at each end, and containing when deposited an unsegmented ovum.

## KEY TO SUBFAMILIES.

- Anterior (œsophageal) part of body longer than posterior, which is much thicker . Trichurinæ, p. 21.  
 Anterior (œsophageal) part of body shorter than, or rarely equal to, posterior, which is only slightly thicker . . . Capillariinæ, p. 23.  
*Trichuridæ* insufficiently known, p 30.

## Subfamily TRICHURINÆ Ransom, 1911.

*Definition.*—TRICHURIDÆ: anterior (œsophageal) portion of the body very slender and longer than the posterior part, which is much thicker and contains the reproductive organs; posterior extremity of body blunt and rounded.

Genus TRICHURIS Roederer, 1761.

Syn., *Trichocephalus* Schrank, 1788.*Mastigodes* Zeder, 1800.

*Definition.*—TRICHURINÆ: mouth simple; cuticle transversely striated; on the ventral portion of the anterior part of the body there is a broad longitudinal bacillary band formed of punctiform projections, which are the points of small rod-like structures originating in the subcuticular cells and penetrating the cuticle, they interrupt the transverse striations; anus terminal or sub-terminal. Male: posterior end of body rolled dorsally in a spiral; spicule surrounded by a prepuce-like sheath, which evaginates when the spicule is protruded; external surface of sheath smooth or covered with spines. Female: posterior extremity slightly curved, but not spirally coiled; vulva near the junction of the anterior and posterior portions of the body. Oviparous, eggs with thick brown shells, with plugs at both ends. Parasites of the intestine of mammals.



Type species: *T. trichiura* (Linnæus, 1771) Stiles, 1901.  
 ♂ 40–45 mm., ♀ 45–50 mm. In man.

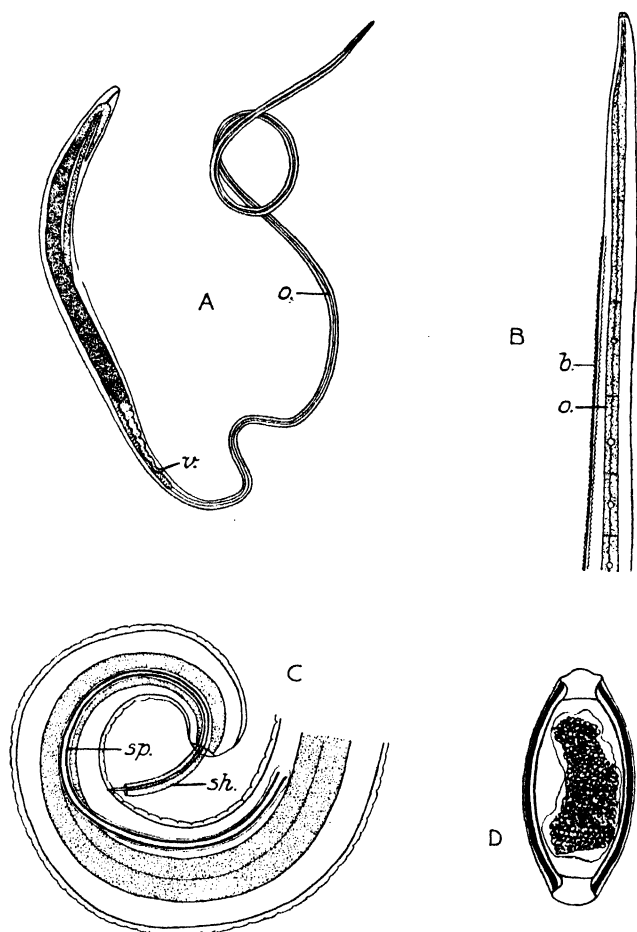


Fig. 3.—*Trichuris trichiura*. A. Female. o, œsophagus; v, vulva.  $\times 6$ .  
 B. Anterior extremity. b, bacillary band; o, œsophagus.  $\times 35$ .  
 C. Posterior extremity of male. sp, spicule; sh, spicule sheath.  $\times 35$ .  
 D. Egg.  $\times 560$ . (Orig.)

Syn., *Ascaris trichiura* Linn., 1771.

*Trichocephalus hominis* Schrank, 1788.

*Trichocephalus dispar* Rud., 1802.

*Mastigodes hominis* (Schrank, 1788) Zeder 1803.

Other species :

*T. alcocki* (Linst., 1906). In *Cervus eldi*.

*T. cameli* (Rud., 1819). In *Camelus* spp.

- Syn., *T. echinophalla* (Nitzsch, 1849).  
*T. campanula* (Linst., 1889). In *Felis dom.*  
*T. carlieri* Gedoelst, 1916. In *Cricetomys gambianus*.  
*T. contorta* (Rud., 1819). In *Georychus capensis*.  
*T. discolor* (Linst., 1906). In *Bos indicus*.  
*T. fossor* Hall, 1916. In *Thomomys fossor*.  
*T. giraffæ* (Dies., 1851). In *Giraffa* sp.  
*T. globulosa* (Linst., 1901). In *Camelus* sp.  
*T. gracilis* (Rud., 1819). In *Dasyprocta aguti*.  
*T. infundibula* (Linstow, 1906). In *Hystrix cristata*.  
*T. leporis* (Froelich, 1789, Rud., 1809). In *Lepus* spp., etc.  
 Syn., *Trichocephalus unguiculatus* Rud., 1809.  
*T. megaloon* Gedoelst, 1917. In *Sciurus prevosti*.  
*T. muris* (Schränk, 1788). In rats and mice.  
 Syn., *Trichocephalus nodosus* Rud., 1809.  
*T. opaca* Barker and Noyes, 1915. In *Fiber* sp.  
*T. ovis* (Abildg., 1795). In cattle, goat, sheep.  
 Syn., *T. affinis* (Rud., 1802).  
*T. serrata* (Linst., 1879). In *Felis dom.*  
*T. skrjabini* Baskakow, 1924. In *Camelus* spp.  
*T. suis* (Schränk, 1788). In the pig.  
 Syn., *Trichocephalus apri* Gmelin, 1790.  
*Trichocephalus crenatus* Rud., 1809.  
*T. vulpis* (Froel., 1789). In the dog and fox.  
 Syn., *Trichocephalus depressiusculus* Rud., 1809.  
 Refs. 10, 16a, 152, 205, 403, 458, 470, 481, 593, 598, 610, 681.

#### Subfamily CAPILLARIINÆ Railliet, 1915.

*Definition*.—TRICHURIDÆ: anterior (œsophageal) portion of the body shorter than, or rarely equal to, the posterior part, which is only slightly thicker.

#### KEY TO GENERA.

1. With a spicule . . . . . Capillaria, p. 23.  
    Without a spicule but with a copulatory  
    sheath . . . . . 2
2. Parasites of liver . . . . . Hepaticola, p. 28.  
    Parasites of lungs . . . . . Eucoleus, p. 29.

#### Genus CAPILLARIA Zeder, 1800.

- Syn., *Trichosoma* Rud., 1819.  
*Trichosomum* Creplin, 1829.  
*Liniscus* Duj., 1845.  
*Thominx* Duj., 1845.  
*Calodium* Duj., 1845.

*Definition*.—**CAPILLARIINÆ**: body capillary; mouth simple; cuticle with bacillary bands, dorsal, ventral, or lateral in position; œsophagus long and gradually increasing in size posteriorly. Male: anus terminal or subterminal, small membranous caudal alæ or bursa-like structure present or absent; spicule long and slender, surrounded by a sheath with or without spines on its

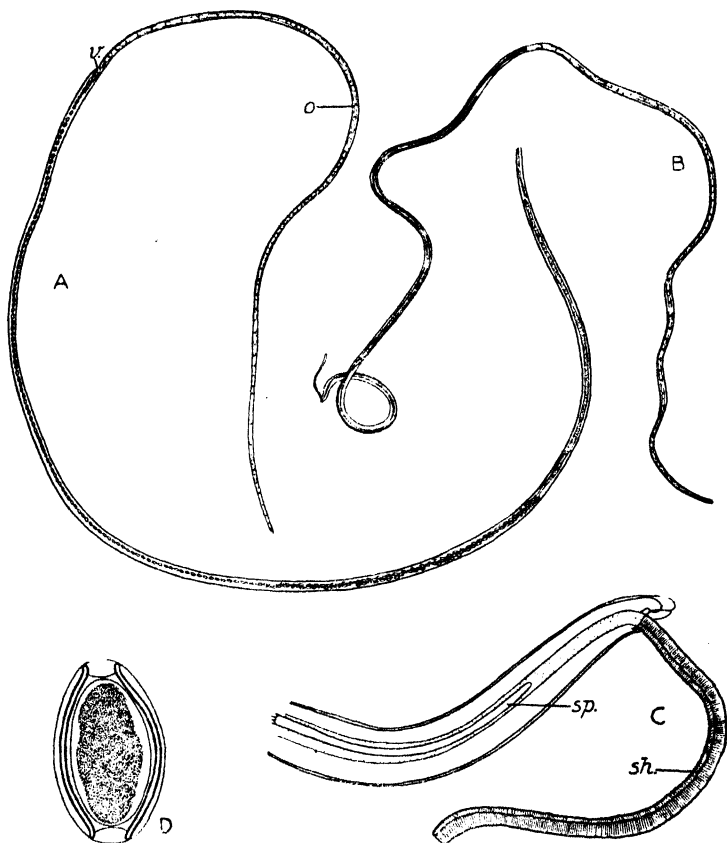


Fig. 4.—*Capillaria columbæ*. A. Female. o, œsophagus; v, vulva.  $\times 18$ . B. Male.  $\times 18$ . C. Posterior extremity of male. sh, spicule sheath; sp, spicule.  $\times 160$ . D. Egg.  $\times 500$ . (Orig.)

surface. Female: vulva near termination of œsophagus. Oviparous, eggs lemon-shaped, with the usual opercular plugs at the poles. Parasites of intestine, or urinary bladder of mammals, birds, etc.

Type species: *C. anatis* (Schrank, 1790). ♂ 11–13 mm., ♀ 21–28 mm. In *Anser ferus*, *Harelda* sp., *Merganser* spp., *Ædemia* sp., *Querquedula* sp.

Syn., *Trichocephalus anatis* Schrank, 1790.

*Trichocephalus capillaris* Rud., 1809.

*Capillaria tumida* Zeder, 1803.

*Trichosoma brevicolle* Rud., 1819.

Other species :

*C. angusta* (Duj., 1845). In *Fringilla cælebs*.

*C. annulosa* (Duj., 1845). In rats.

Syn., *Calodium annulosum* Duj., 1845.

*C. auritæ* Travassos, 1914. In *Didelphys aurita*.

*C. bacillata* (Eberth, 1863). In *Mus musculus*.

Syn., *Trichosoma bacillatum* Ebert, 1863.

*C. bombinatoris* (Linst., 1892). In *Bombinator igneus*.

*C. bovis* (Schnyder, 1906). In cattle.

*C. brevipes* Ransom, 1911. In sheep.

*C. brevis* (Linst., 1877). In *Totanus fuscus*.

*C. brevispicula* (Linst., 1873). In *Blicca bjærkna*, *Lota* sp.

*C. caprimulgi* (Rud., 1819). In *Caprimulgus europæus*.

*C. carbonis* (Rud., 1819). In *Phalacrocorax carbo*.

*C. charadrii* (Rud., 1819). In *Ægialitis* sp., *Himantopus* sp.

*C. chrysotidis* (Walter, 1866). In *Chrysotis amazonicus*.

*C. collaris* (Linst., 1873). In *Gallus dom.*

*C. columbæ* (Rud., 1819). In *Columba dom.*

Syn., *Trichosoma columbæ* Rud., 1819.

*Calodium tenue* Duj., 1845, not *Eucoleus tenuis* Duj., 1845.

*Trichosoma tenuissimum* Dies., 1851, not Rud., 1803.

*Capillaria dujardini* Trav., 1914.

*C. contorta* (Crep., 1839). In *Corvus* spp., *Sterna* sp., etc.

*C. convoluta* (Fourm., 1885). In *Ossifraga gigantea*.

*C. corvorum* (Rud., 1819). In *Corvus* sp., *Pica* sp., *Nucifraga* sp.

*C. crotali* (Rud., 1819). In *Crotalus terrificus*.

*C. crypturi* (Rud., 1819). In *Tinamus tao*.

*C. curvicauda* (Duj., 1845). In *Hirundo* sp., *Micropus* sp.

*C. cylindrica* (Eberth, 1863). In *Buteo vulgaris*.

*C. dispar* (Duj., 1845). In *Buteo* sp., *Falco* sp.

*C. droumondi* Trav., 1915. In *Cygnus* sp.

*C. dubia* Trav., 1917. In *Atilla cinerea*.

*C. entomelas* (Duj., 1845). In *Mustela foina*.

*C. erinacei* (Rud., 1819). In *Erinaceus europæus*

*C. exigua* (Duj., 1845). In *Erinaceus* sp.

*C. exilis* (Duj., 1845). In *Turdus merula*.

Syn., *Trichosoma exile* Duj., 1845.

- C. falconum* (Rud., 1919). In *Buteo* sp., *Milvus* sp., *Circus* sp., *Accipiter* sp.
- C. feliscati* Bellingham, 1844. In *Felis catus*.
- C. filiformis* (Linst., 1885). In *Triton* sp.
- C. fringillæ* (Rud., 1819). In *Fringilla cælebs*.
- C. fritschi* Trav., 1914. In *Malapterurus electricus*.
- C. gracilis* (Bellingham, 1840). In *Merluccius* spp.
- C. hirundinis* (Rud., 1819). In *Hirundo rustica*.
- C. hydrochæri* Trav., 1916. In *Hydrochærus capibara*.
- C. incrassata* (Dies., 1851). In *Sorex araneus*.  
Syn., *Liniscus exilis* Duj., 1845 [homonym].
- C. inflexa* (Rud., 1819). In *Monticola* sp., *Turdus* sp.
- C. leidyella* Trav., 1915. In *Colaptes maximus*.  
Syn., *Trichosoma picorum* Leidy, 1856, not Rud., 1819.
- C. leidy* (Trav., 1914). In *Mus norvegicus*.  
Syn., *Trichosomum tenuissimum* Leidy, 1891, not Rud., 1803, not Dies., 1851.
- C. lemmi* (Retzius, 1841). In *Microtus terrestris*.
- C. leporis* (Dies., 1851). In *Lepus timidus*.  
Syn., *Filaria pulmonalis* Froel., 1802, in part.
- C. leucisci* Hesse, 1923. In *Leuciscus phoxinus*.
- C. linearis* (Leidy, 1856). In *Felis catus*.
- C. linstowi* Trav., 1914. In *Talpa europæa*, *Crocidura* sp.
- C. longevaginata* (Linst., 1879). In *Alauda arvensis*.
- C. longicollis* (Rud., 1819). In *Gallus* sp., etc.
- C. longifila* (Duj., 1845). In *Accentor modularis*.
- C. longipes* Ransom, 1911. In antelope and sheep.
- C. longispicula* (Sonsino, 1889). In *Python molurus*.
- C. longistriata* Walton, 1923. In *Colaptes* sp.
- C. manica* (Duj., 1845). In *Fringilla cælebs*.  
Syn., *Thominx manica* Duj., 1845.
- C. meleagris-gallopavo* (Barile, 1912). In *Meleagris* sp.
- C. mingazzinii* (Rizzo, 1902). In *Tropidonotus natrix*.
- C. modiglianii* (Parona, 1897). In *Lachesis sumatranus*.
- C. mucronata* (Molin, 1858). In *Mustela foina*.
- C. murinæ* Trav., 1914. In *Eunectes murina*.
- C. muris-musculi* (Dies., 1861). In *Mus musculus*.
- C. muris-sylvatici* (Dies., 1851). In *Mus sylvaticus*.
- C. myoxi-nitelæ* (Dies., 1851). In *Eliomys quercinus*.
- C. obtusiuscula* (Rud., 1819). In *Grus grus*.
- C. ornata* (Duj., 1843). In *Anthus pratensis*.
- C. ovopunctata* (Linst., 1873). In *Sturnus vulgaris*.
- C. pachyderma* (Linst., 1877). In *Podiceps fluviatilis*.

- C. pachykeramota* (Wedl, 1856). In *Felis tigrina*.  
*C. papillifer* (Linst., 1877). In *Chelidon* sp., *Hirundo* sp.  
*C. papilligera* (Raill. and Henry, 1911). In *Tetrao urogallus*.  
 Syn., *Trichosoma papillosum* Blome, 1909, not Wedl, 1856.  
*C. blomei* Travassos, 1914.  
*C. papillosa* (Polonio, 1860). In *Mus norvegicus*.  
*C. parilis* (Kowalewsky, 1903). In *Bubo ignavus*.  
*C. parvumspinosa* Raill. and Henry, 1911. In *Rhea americana*.  
*C. picorum* (Rud., 1819). In *Dendrocopus* sp., *Gecin* spp.  
*C. plica* (Rud., 1819). In *Canis* sp., *Vulpes* sp.  
*C. protracta* (Duj., 1845). In *Vanellus* spp.  
*C. pusilla* Trav., 1914. In *Sturnira lilium*.  
*C. putorii* (Rud., 1819). In *Putorius putorius*.  
*C. ransomia* Barker and Noyes, 1915. In *Fiber* sp.  
*C. recurva* (Solger, 1877). In *Crocodylus americanus*.  
*C. resecta* (Duj., 1843). In *Corvus* sp., *Garrulus* sp., etc.  
*C. retusa* (Raill., 1893). In *Gallus dom.*, *Numida* sp.  
*C. rigidula* (Duj., 1845). In *Accentor modularis*.  
*C. rubra* (Linton, 1892). In *Spizella socialis*.  
*C. schmidtii* (Linstow, 1874). In *Mus norvegicus*.  
*C. similis* (Kowalewsky, 1903). In *Turdus pilaris*.  
*C. sonsinoi* (Parona, 1897). In *Zamenis gemonensis*.  
*C. speciosa* (Beneden, 1873). In *Vespertilio* spp.  
*C. spinulosa* (Linst., 1890). In *Nyroca ferina*.  
*C. spiralis* (Molin, 1858). In *Plegadis falcinellus*.  
*C. splenæca* (Duj., 1843). In *Sorex araneus*.  
 Syn., *Trichosoma splenæcum* Duj., 1843.  
*Calodium splenæcum* Duj., 1845.  
*C. striata* (Linst., 1879). In *Accipiter nisus*.  
*C. strumosa* (Reibisch, 1893). In *Gallus dom.*, *Phasianus* sp.  
*C. talpæ* (Siebold, 1850). In *Talpa europæa*.  
*C. tenuissima* (Rud., 1803). In *Strix* sp., *Asio* sp., *Bubo* sp., etc.  
*C. tomentosa* (Duj., 1843). In *Idus melanotus*, *Scardinius* sp.,  
*Cyprinus* sp.  
*C. totani* (Linst., 1875). In *Tringoides* sp.  
*C. tridens* (Duj., 1845). In *Sylvia luscinia*.  
*C. triloba* (Linst., 1875). In *Vanellus* sp.  
*C. tritonis-cristati* (Dies., 1861). In *Triton cristatus*.  
*C. tritonis-punctati* (Dies., 1851). In *Triton* spp.  
*C. tuberculata* (Linst., 1914). In *Acipenser ruthenus*.  
*C. turdi* (Rud., 1819). In *Geocichla mollissima*.  
*C. vanelli* (Rud., 1819). In *Vanellus vanellus*.  
*C. vespertilionis* (Rud., 1819). In *Vespertilio noctula*.

Travassos (1915) has divided the genus *Capillaria* into two subgenera :—

**Subgenus CAPILLARIA (Zeder, 1800) Travassos, 1915.**

**Definition.**—CAPILLARIA in which the sheath of the spicule is not provided with spines. Contains the species :

*anatis, angusta, annulosa, auritæ, brevispicula, chrysotidis, columbæ, convoluta, curvicauda, droumondi, entomelas, exigua, exilis, incrassata, inflexa, leidyella, longipes, longicollis, longevaginata, longifila, longispicula, mingazzinii, mucronata, murinæ, obtusiuscula, ornata, ovopunctata, pachykeramota, pusilla, resecta, retusa, rigidula, schmidtii, similis, speciosa, splenæca, and tuberculata.*

**Subgenus THOMINX (Duj., 1845) Travassos, 1915.**

**Definition.**—CAPILLARIA in which the sheath of the spicule is provided with spines. Contains the species : *manica, bacillata, collaris, contorta, dispar, dubia, falconua, filiformis, gracilis, hydrochaeri, meleagris, pachyderma, papillifer, papilligera, parilis, spinulosa, striata, strumosa, tenuissima, totani, tridens, and triloba.*

Refs. 131, 205, 216, 403, 458, 477, 572, 627, 659, 681, 682.

**Genus HEPATICOLA Hall, 1916.**

**Definition.**—CAPILLARIINÆ: body capillary; mouth simple; cuticle apparently without bacillary band. Male: anterior and posterior portions of the body about equal; spicule absent, but represented by a membranous sheath. Female: anterior portion of body half as long as the posterior portion; vulva prominent, opening in œsophageal region. Oviparous, eggs of the usual type, but with the outer shell striate. Parasites of liver of rodents (and man).

Type species : *H. hepatica* (Bancroft, 1893).

♂ and ♀ 40–50 mm. In *Rattus* spp., *Lepus* sp., man.

Syn., *Trichocephalus hepaticus* Bancroft, 1893.

Other species : *H. soricicola* Nishigori, 1924. In *Sorex* sp.

Refs. 9, 125a, 205, 373a, 403, 405.

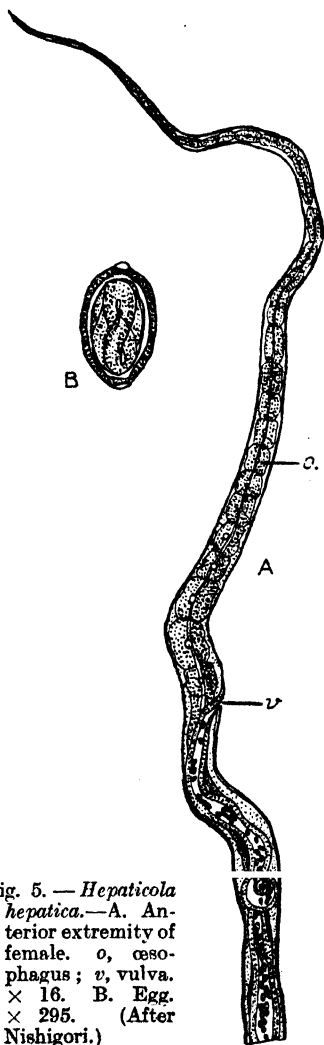


Fig. 5. — *Hepaticola hepatica*.—A. Anterior extremity of female. o, œsophagus; v, vulva. × 16. B. Egg. × 295. (After Nishigori.)

Genus *EUCOLEUS* Dujardin, 1845.

*Definition.*—*CAPILLARIINÆ*: anterior (œsophageal) portion of the body much shorter than the posterior portion; dorsal and ventral bacillary bands present. Male: tail consisting of two short lobes united by a delicate membrane; spicule absent, represented by a copulatory sheath, protrusible and thickly armed with fine spines. Female: posterior extremity curved slightly, tail blunt; vulva lateral, not projecting, and opening at the termination of the œsophagus. Oviparous, eggs whitish with

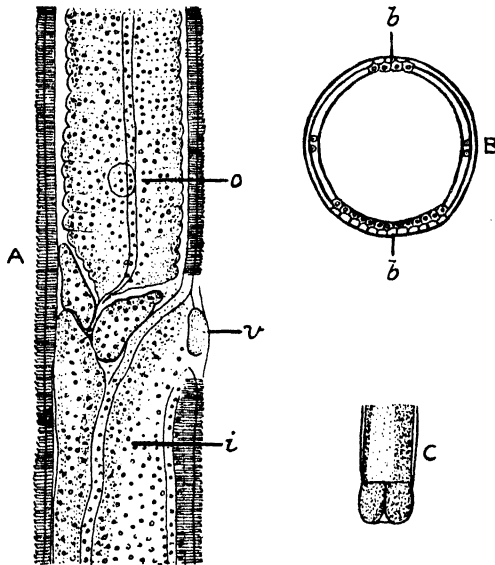


Fig. 6.—*Eucoleus ærophilus*. A. Vulvar region of female. *i*, intestine; *o*, œsophagus; *v*, vulva. B. Transverse section. *b*, bacillary band. (After Eberth.) C. Posterior extremity of male.  $\times 200$ . (After Schneider.)

a thick granular shell, they are held on the surface of the worm by a kind of mucilage. Parasites of respiratory tract of mammals.

Type species: *E. ærophilus* (Creplin, 1839). ♂ 24.5 mm., ♀ 32 mm. In fox and cat.

Syn., *Trichosoma ærophilum* Creplin, 1839.

Other species: *E. tenuis* Duj., 1845. In *Erinaceus europæus*. Refs. 131, 132, 405, 480.

Possibly *Eucoleus* and *Hepaticola* are identical and Railliet states that *E. tenuis* has been found in the liver of *Erinaceus europæus*.



**TRICHURIDÆ insufficiently known.**Genus **SCLEROTRICHUM** Rud., 1819.

*Definition.*—TRICHURINÆ: body very long and composed of two parts, the anterior portion very thin, ending in a disc bordered with hooks in the centre of which the mouth opens, and the posterior portion swollen, rolled into a spiral, and nodular.

According to Dujardin (1845) the only species of this incompletely known genus, which itself appears doubtful, has been found by Pallas in the stomach of *Lacerta apus*, from Russia and named by this author *Tænia spirillum*. Gœze has reproduced the figures given by Pallas and has placed the worm in his genus *Trichocephalus*, of which Zeder changed the name to *Mastigodes*. Rudolphi, who also studied this hel-

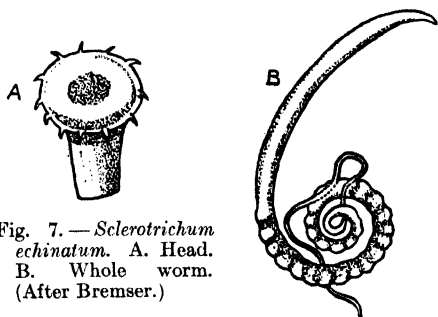


Fig. 7. — *Sclerotrichum echinatum*. A. Head. B. Whole worm. (After Bremser.)

minth, preserved in alcohol, named it *Trichocephalus echinatus*, and made a distinct division for it from his other *Trichocephalus* species; de Blainville made it a genus apart under the name *Mastigodes* already applied by Zeder to all the *Trichocephalus* spp.; finally Nordmann, in his annotations in the third volume on invertebrates of Lamarck, also considered it should be a separate genus under the name *Sclerotrichum* proposed by Rudolphi. Dujardin also expresses the same opinion, but admits that the worm is not very well known.

Type species: *S. echinatum* (Rud., 1809). ♀ 54 mm. In the stomach of *Lacerta apus*.

Syn., *Trichocephalus echinatus* Rud., 1809.

*Tænia spirillum* Pallas, 1781.

*Trichocephalus spirillum* (Pallas, 1781) Bremser, 1824.

*Mastigodes spirillum* (Pallas, 1781) Blainville, 1828.

*Trichocephalus lacertæ* Schrank, 1788.

*Mastigodes lacertæ* (Schrank, 1788) Zeder, 1803.

*Trichocephalus ophisauris* Froriep MS. in Rud., 1809.

Refs. 53b, 77, 123, 131, 186, 477, 627.

Genus **ONCOPHORA** Diesing, 1851.

*Definition.*—TRICHURINÆ: body clearly divided into two portions, the anterior much longer than the posterior, but

relatively thicker than in *Trichuris*. The posterior part of the body near its commencement is furnished with a humped-shaped swelling on which the vulva is situated; the posterior extremity tapers to a fine point. The male is unknown. Viviparous. The above description is based on two females, the anterior portion of which was incomplete.

Type species: *O. neglecta* Dies., 1851. ♀ 67–95 mm. In gall bladder of *Thynnus vulgaris*.

Syn., *Trichocephalus gibbosus* Rud., 1819.

Refs. 123, 125, 131.

#### FAMILY TRICHOSOMOIDIDÆ n. f.

*Definition.*—TRICHUROIDEA: male much smaller than the female and found in the vagina or uterus of the latter; spicule and

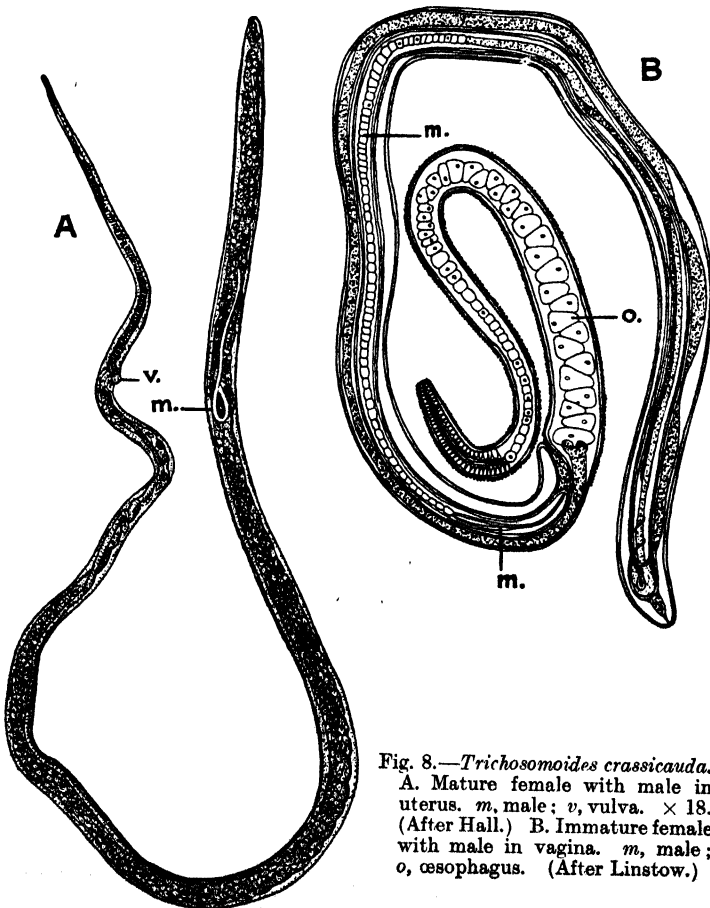


Fig. 8.—*Trichosomoides crassicauda*.  
A. Mature female with male in uterus. m, male; v, vulva. × 18. (After Hall.) B. Immature female with male in vagina. m, male; o, oesophagus. (After Linstow.)

copulatory sheath absent. Female : vulva near posterior end of œsophagus. Oviparous, eggs with a thick shell and an operculum at each end, containing a fully-formed embryo when deposited. Parasites of urinary tract of rodents.

Subfamily TRICHOSOMOIDINÆ Hall, 1916.

*Definition.*—TRICHOSOMOIDINÆ : with the characters of the family.

Genus TRICHOSOMOIDES Railliet, 1895.

Syn., *Trichodes* Linstow, 1874, preoccupied.

*Definition.*—TRICHOSOMOIDINÆ : males and females of very different size ; anterior portion of the œsophagus devoid of cell body, and remainder surrounded by a cell chain ; anus terminal in both sexes. Male : bursa, spicule, or copulatory organs of any sort, absent. Female : vulva just behind the termination of the œsophagus. Parasites of urinary tract of rodents.

Type species : *T. crassicauda* (Bellingham, 1840). ♂ 1·5–2·5 mm., ♀ 10·5–13 mm. In rats.

Syn., *Trichosoma crassicauda* Bellingham, 1840.

*Trichodes crassicauda* (Bellingham, 1840) Linstow, 1874.

Refs. 47, 205, 309, 399, 617.

FAMILY TRICHINELLIDÆ WARD, 1907.

Syn., *Trichinidæ* Cobbold, 1879.

*Definition.*—TRICHUROIDEA : small worms, posterior portion of body only slightly thicker than the anterior ; mouth simple. Male : spicule and copulatory sheath absent. Female : vulva in œsophageal region. Viviparous. Parasites of mammals ; adults in intestine and larvæ in muscles.

Subfamily TRICHINELLINÆ Ransom, 1911.

*Definition.*—TRICHINELLIDÆ : with the characters of the family.

Genus TRICHINELLA Railliet, 1895.

Syn., *Trichina* Owen, 1835, preoccupied.

*Definition.*—TRICHINELLINÆ : body of nearly uniform diameter throughout, becoming slightly thicker posteriorly. Mouth simple, unarmed ; œsophagus, anterior part consists of a simple membranous tube, the posterior part is surrounded by a single row of cells ; anus terminal in both sexes. Male : posterior extremity with a

conical projection on each side of the protrusible cloaca, and between them lie four papillæ; spicule and sheath absent.

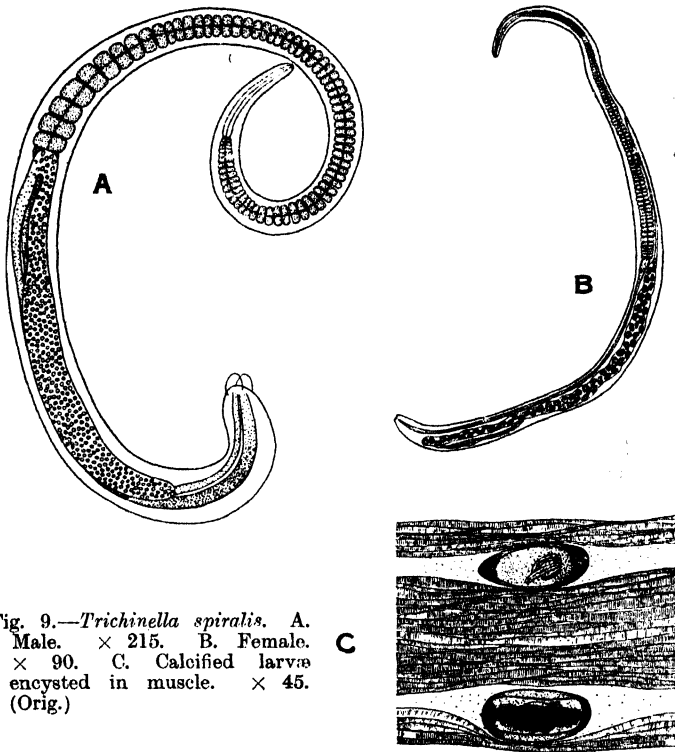


Fig. 9.—*Trichinella spiralis*. A. Male.  $\times 215$ . B. Female.  $\times 90$ . C. Calcified larvæ encysted in muscle.  $\times 45$ . (Orig.)

Female: vulva about the middle of the cellular part of œsophagus. Viviparous. Parasites of intestine of mammals.

Type species: *T. spiralis* (Owen, 1835). ♂ 1.4–1.6 mm., ♀ 3–4 mm. In numerous mammals.

Syn., *Trichina spiralis* Owen, 1835.

Refs. 103, 205, 301, 383, 384, 399, 458, 660.

**Superfamily STRONGYLOIDEA** Weinland, 1858; Hall, 1916.

**Definition.**—EUNEMATODA: males with a cuticular bursa copulatrix supported by rays. Œsophagus usually more or less club-shaped posteriorly, but without a definite spherical bulb and without a valvular apparatus; intestine almost always simple. Usually oviparous, occasionally viviparous.

## KEY TO FAMILIES.

1. Parasites of alimentary canal or,  
rarely, of renal tissue . . . . . 2  
Parasites of respiratory system . . . . . 5
2. More or less filiform worms with  
buccal capsule feebly-developed  
or absent . . . . . Trichostrongylidæ, p. 115.  
Stouter worms with buccal cap-  
sule well-developed . . . . . 3
3. Buccal capsule bivalvular . . . . . Diaphanocephalidæ, p. 111.  
Buccal capsule continuous . . . . . 4
4. Oral aperture guarded by ventral  
cutting organs, *i.e.*, teeth, or  
chitinous plates . . . . . Ancylostomidæ, p. 90.  
Oral aperture not guarded by  
ventral cutting organs; with  
or without a corona radiata . . . . . Strongylidæ, p. 34.
5. With a well-developed chitinous  
buccal capsule . . . . . Syngamidæ, p. 156.  
Buccal capsule rudimentary or  
absent . . . . . 6
6. With a well-developed bursa with  
more or less typical rays . . . . . Metastrongylidæ, p. 158.  
Bursa rudimentary supported by  
a few atypical rays . . . . . Pseudaliidæ, p. 166.
7. *Strongyloidea* insufficiently known, p. 172.

## FAMILY STRONGYLIDÆ BAIRD, 1853.

*Definition.*—STRONGYLOIDEA : with a chitinous buccal capsule, the oral aperture of which is not guarded by ventral cutting organs, but is usually surrounded by a corona radiata (or leaf-crown). Parasites of the alimentary canal, or, rarely, of renal tissue.

## KEY TO SUBFAMILIES.

1. With a transverse ventral cervical  
groove . . . . . Œsophagostominæ, p. 85.  
Without a transverse ventral  
cervical groove . . . . . 2
2. Buccal capsule cylindrical or ring-  
shaped . . . . . Trichoneminæ, p. 52.  
Buccal capsule globular, sub-  
globular or infundibular . . . . . 3

3. Bursa copulatrix well-developed and terminal. Parasites of alimentary canal . . . Strongylinæ, p. 35.  
 Bursa copulatrix very short and subterminal. Parasites of renal and perirenal tissue . . . Stephanurinae, p. 49.

Subfamily **STRONGYLINÆ** Railliet, 1893.

*Definition.*—**STRONGYLIDÆ**: without a transverse ventral cervical groove; buccal capsule large and globular, subglobular, or infundibular. Duct of the dorsal œsophageal gland almost always prolonged as a ridge on the dorsal wall of the buccal capsule to open near its oral margin. Bursa copulatrix well-developed and terminal. Parasites of alimentary canal.

KEY TO GENERA.

1. Buccal capsule funnel-shaped, much longer than broad . . . Choniangium, p. 40.  
 Buccal capsule globular or subglobular . . . 2
2. With 3 simple lancets in œsophageal funnel not projecting into buccal capsule . . . Œsophagodontus, p. 42.  
 With 3 teeth, each consisting of two lamellæ, in œsophageal funnel, and projecting into buccal capsule . . . Triodontophorus, p. 44.  
 Without teeth in œsophageal funnel 3
3. Mouth directed antero-ventrally . Ransomus, p. 41.  
 Mouth directed straight forwards or antero-dorsally . . . 4
4. Corona radiata absent or rudimentary . . . 5  
 Corona radiata well-developed . 6
5. Mouth collar subterminal and very prominent . . . Acheilostoma, p. 49.  
 Mouth collar absent . . . Globocephalus, p. 48.
6. Elements of external leaf-crown of two lengths; externo-dorsal ray of bursa trifurcate . . . Equinurbia, p. 39.  
 Elements of external leaf-crown all of same length; externo-dorsal ray of bursa simple . . . 7

7. Without an internal leaf-crown ;  
vulva about commencement of  
posterior third of body . . . . . 8  
With an internal leaf-crown ; vulva  
near anus . . . . . 9
8. Dorsal ray of bursa undivided ex-  
cept at its tip ; gubernaculum  
absent . . . . . Decrusia, p. 38.  
Dorsal ray of bursa divided to near  
its base ; gubernaculum present . . . . . Strongylus, p. 37.
9. Elements of external leaf-crown  
fimbriated . . . . . Castorstrongylus, p. 46.

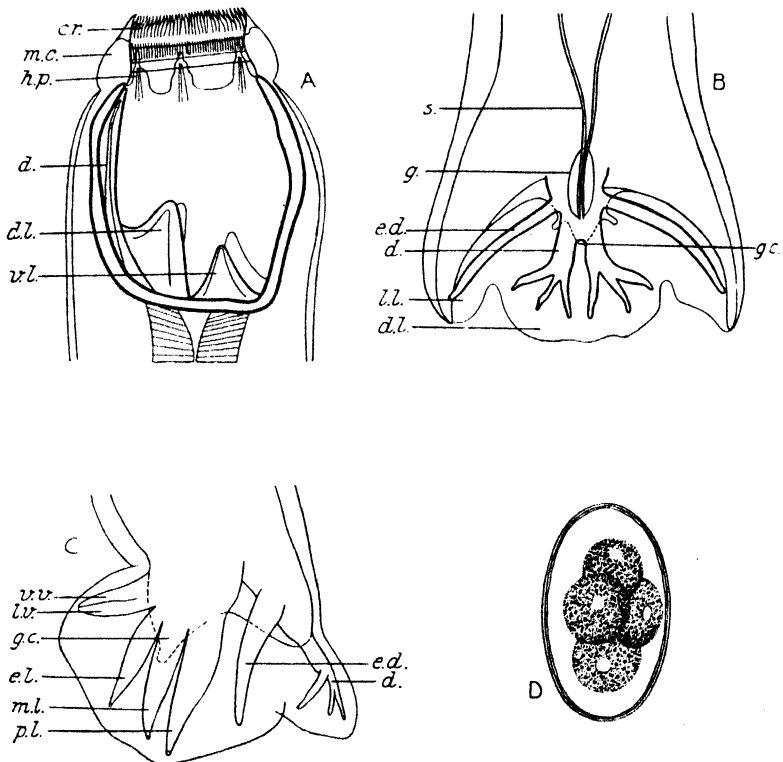


Fig. 10.—*Strongylus equinus*. A. Head, lateral view. *c.r.*, corona radiata ; *d.*, duct of dorsal oesophageal gland ; *d.l.*, subdorsal teeth ; *h.p.*, head papillae ; *m.c.*, mouth collar ; *v.l.*, subventral teeth.  $\times 35$ . B. Bursa, dorsal view. *s.*, spicule ; *g.*, gubernaculum ; *e.d.*, externo-dorsal ray ; *d.*, dorsal ray ; *l.l.*, lateral lobe of bursa ; *d.l.*, dorsal lobe ; *g.c.*, genital cone.  $\times 35$ . C. Bursa, lateral view. *v.v.*, ventro-ventral ray ; *l.v.*, latero-ventral ray ; *g.c.*, genital cone ; *e.l.*, externo-lateral ray ; *m.l.*, medio-lateral ray ; *p.l.*, postero-lateral ray ; *e.d.*, externo-dorsal ray ; *d.*, dorsal ray.  $\times 35$ . D. Egg.  $\times 325$ . (Orig.)

## Elements of external leaf-crown

not fimbriated . . . . . 10.

10. Mouth directed straight forwards. Craterostomum, p. 45.

Mouth directed antero-dorsally . Codistomum, p. 45.

Genus **STRONGYLUS** Mueller, 1780, or Goeze, 1782.Syn., *Sclerostoma* Rud., 1809.

*Definition.*—**STRONGYLINÆ**: mouth directed straight forwards, surrounded by a corona radiata or external leaf-crown arising from the mouth collar; buccal capsule subglobular without an internal leaf-crown, and with or without teeth in its depth. Male: bursal formula—ventral ray cleft, externo-lateral and laterals arising from a common trunk, externo-dorsal arises from a common trunk with the dorsal, dorsal doubled almost as far as the origin of the externo-dorsal ray, each branch ending in three digitations; spicules equal, gubernaculum present. Female: vulva near the commencement of the posterior third of the worm. Parasites of equines (and *Varanidæ*).

Type species: *S. equinus* Mueller, 1780. ♂ 27–30 mm., ♀ 35–55 mm. In equines.

Syn., *Sclerostomum equinum* (Mueller, 1780) Looss, 1900.

*Strongylus armatus* Rud., 1802.

Other species:

*S. asini* Boulenger, 1920. In equines.

*S. edentatus* (Looss, 1900). In equines.

*S. intermedius* Monnig, 1924. In *Varanus* sp.

*S. vulgaris* (Looss, 1900). In equines.

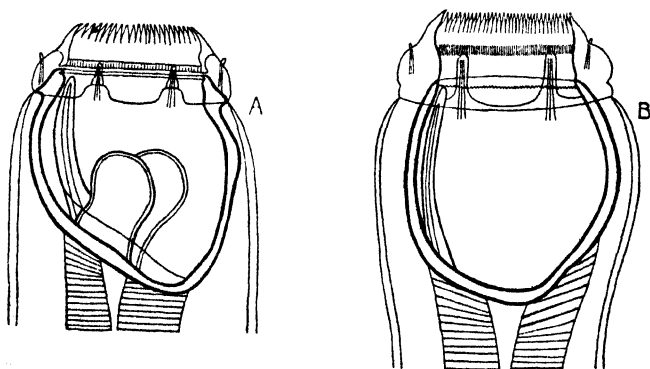


Fig. 11.—*Strongylus (Delafondia) vulgaris*. A. Head, lateral view.  $\times 56$ .  
*Strongylus (Alfortia) edentatus*. B. Head, lateral view.  $\times 35$ . (Orig.)



Railliet, 1923, has subdivided the genus *Strongylus* into the following subgenera :—

**Subgenus STRONGYLUS** (Göze, 1782) Railliet, 1923.

*Definition*.—Head not swollen; two subventral and two subdorsal teeth at the base of the buccal capsule. Contains the species *equinus*.

**Subgenus ALFORTIA** Railliet, 1923.

*Definition*.—Head slightly swollen; without teeth at the base of the buccal capsule. Contains the species *edentatus*.

**Subgenus DELAFONDIA** Railliet, 1923.

*Definition*.—Head swollen or not; without subventral teeth, but with two subdorsal teeth at the base of the buccal capsule. Contains the species *vulgaris* and *asini*.

**Subgenus DECRUSIA** (Lane, 1914) Railliet, 1923.

*Definition*.—*Vide Decrusia* Lane, 1914.

Refs. 63, 251, 338, 363, 366, 413.

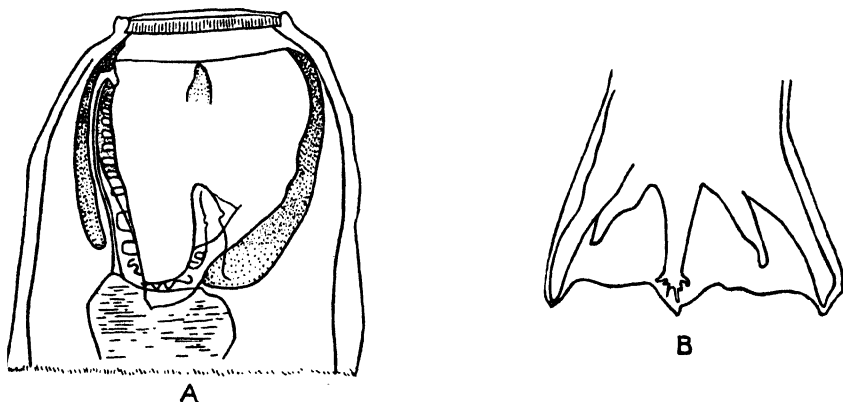


Fig. 12.—*Decrusia additicta*. A. Head, lateral view.  $\times 75$ . B. Bursa, dorsal view.  $\times 38$ . (After Lane.)

**Genus DECRUSIA** Lane, 1914.

*Definition*.—STRONGYLINÆ: closely resembles *Strongylus*, but differs in that the head is slightly tilted dorsally, the buccal capsule has two subventral teeth in its depth, there is no gubernaculum, the dorsal ray is undivided except at its tip where it terminates in four to six digitations, and the externo-dorsal ray is short. Parasites of elephants.

Type species: *D. additicta* (Railliet, Henry, and Bauche, 1914).  
♂ 14 mm., ♀ 15 mm. In *Elephas indicus*.

Syn., *Strongylus additictus* Railliet, Henry, and Bauche, 1914.

*D. decrussi* Lane, 1914.

Refs. 221, 251, 255, 257, 448.

Genus **EQUINURBIA** Lane, 1914.

*Definition.*—**STRONGYLINÆ**: mouth directed slightly dorsally, with an external leaf-crown consisting of elements of two different lengths arising from the mouth collar; buccal capsule sub-globular, without an internal leaf-crown and without teeth in its

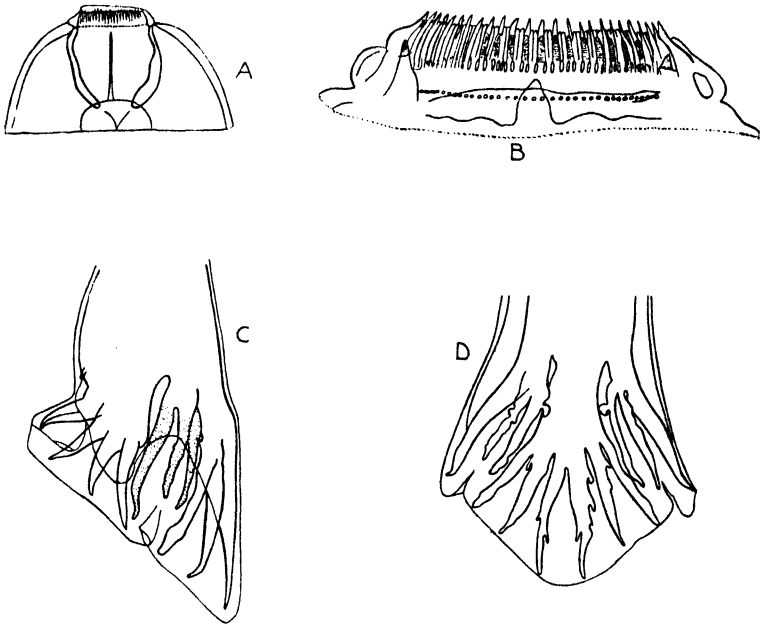


Fig. 13.—*Equinurbia sipunculiformis*. A. Head, dorsal view.  $\times 28$ . B. Corona radiata and cephalic papillae, from the left side.  $\times 120$ . C. Bursa, lateral view.  $\times 30$ . D. Bursa, dorsal view.  $\times 30$ . (After Lane.)

depth. Male: bursal formula—ventral ray cleft, externo-lateral and laterals arising from a common trunk, externo-dorsal arises separately from the dorsal and almost immediately breaks up into three branches of which the first is longest, dorsal ray split for almost half its length with two lateral branches arising from the common trunk immediately before it bifurcates; spicules equal, gubernaculum absent. Female: vulva opens on a prominence close to the anus. Parasites of elephants.

Type species: *E. sipunculiformis* (Baird, 1859). ♂ 15 mm., ♀ 27.5 mm. In elephants.

Syn., *Sclerostoma sipunculiforme* Baird, 1859.

*Cylicostomum sipunculiforme* (Baird, 1859) Railliet, Henry, and Bauche, 1914.

Refs. 251, 255, 257, 448.

Genus *CHONIANGIUM* Railliet, Henry, and Bauche, 1914.

Syn., *Asifa* Lane, 1914.

*Definition.*—*STRONGYLINÆ*: anterior extremity obliquely truncate, so that the mouth is directed antero-dorsally; with an external leaf-crown arising from the mouth collar; buccal

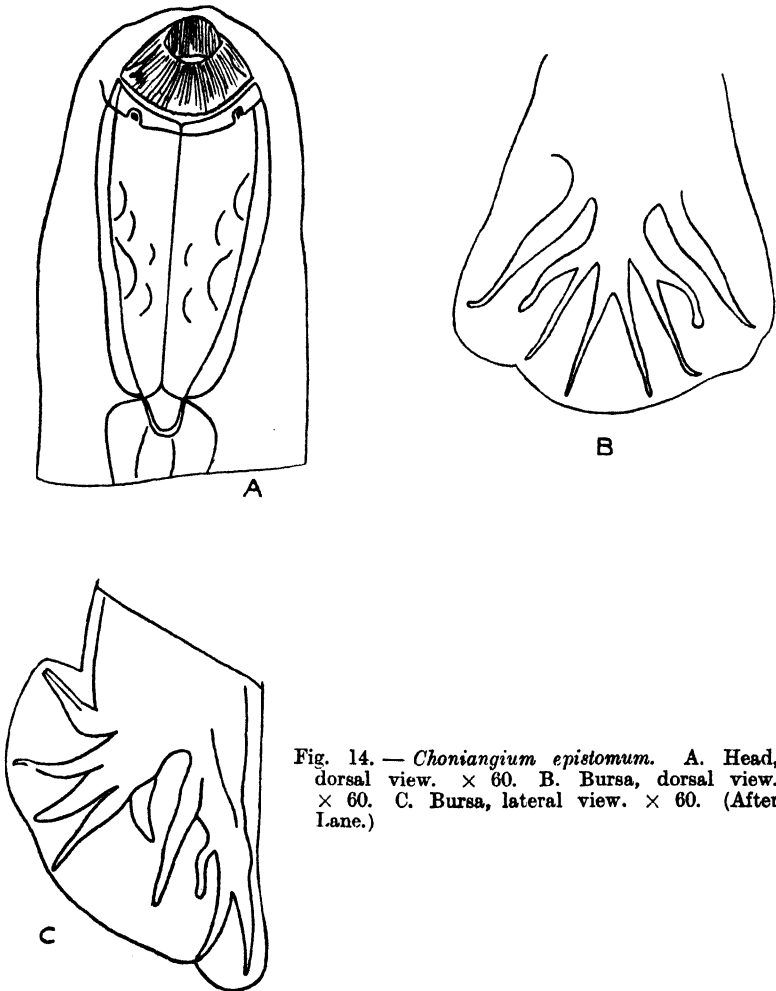


Fig. 14. — *Choniangium epistomum*. A. Head, dorsal view.  $\times 60$ . B. Bursa, dorsal view.  $\times 60$ . C. Bursa, lateral view.  $\times 60$ . (After Lane.)

capsule very long and narrowing posteriorly, without an internal leaf-crown and without teeth in its depth, but with about five pairs of irregular cuticular prominences projecting into the cavity about the middle of its length. Male: bursal formula—ventral ray cleft, externo-lateral and laterals arising from a common trunk, externo-dorsal arising from a common trunk with the

dorsal, dorsal bifurcate for about half its length the common trunk giving off a lateral branch on each side, which almost immediately bifurcates; spicules equal; gubernaculum present. Female: vulva near the anus. Parasites of elephants.

Type species: *C. epistomum* (Piana and Stazzi, 1900). ♂ 14 mm., ♀ 19 mm. In elephants.

Syn., *Sclerostoma epistomum* Piana and Stazzi, 1900.

*Asifta vasifa* Lane, 1914.

Refs. 251, 255, 257, 392, 448.

Genus **RANSOMUS** \* Hall, 1916.

*Definition*.—**STRONGYLINÆ**: anterior extremity obliquely truncate, so that the mouth is directed antero-ventrally; with an

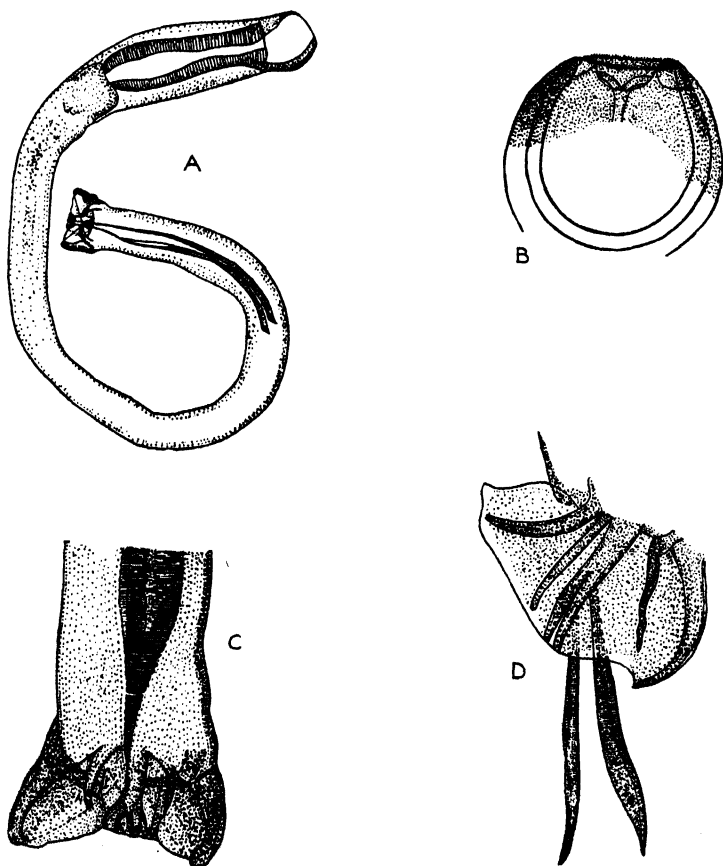


Fig. 15.—*Ransomus rodentorum*. A. Male. B. Head, dorsal view. C. Bursa, dorsal view. D. Bursa, lateral view. (After Hall.)

\* Hall, 1916, placed this genus in a special subfamily *Ransominae*.

external leaf-crown; buccal capsule globular, without teeth in its depth. Male: bursal formula—ventral ray cleft, externo-lateral arising separately from the laterals, lateral bifurcated for about half its length, externo-dorsal arises separately from the dorsal, dorsal ends in four almost equal digitations; spicules equal and alate; gubernaculum present. Female: vulva opens a short distance in front of the anus. Parasites of rodents.

Type species: *R. rodentorum* Hall, 1916. ♂ 4.64–8.2 mm. ♀ 8–9.2 mm. In rodents.

Ref. 205.

Genus **ÆSOPHAGODONTUS** Railliet and Henry, 1902.

Syn., *Pseudosclerostomum* Quiel, 1919.

*Definition.*—STRONGYLINÆ: mouth directed straight forwards with an external leaf-crown arising from the mouth collar; buccal capsule infundibular with an internal leaf-crown arising from its

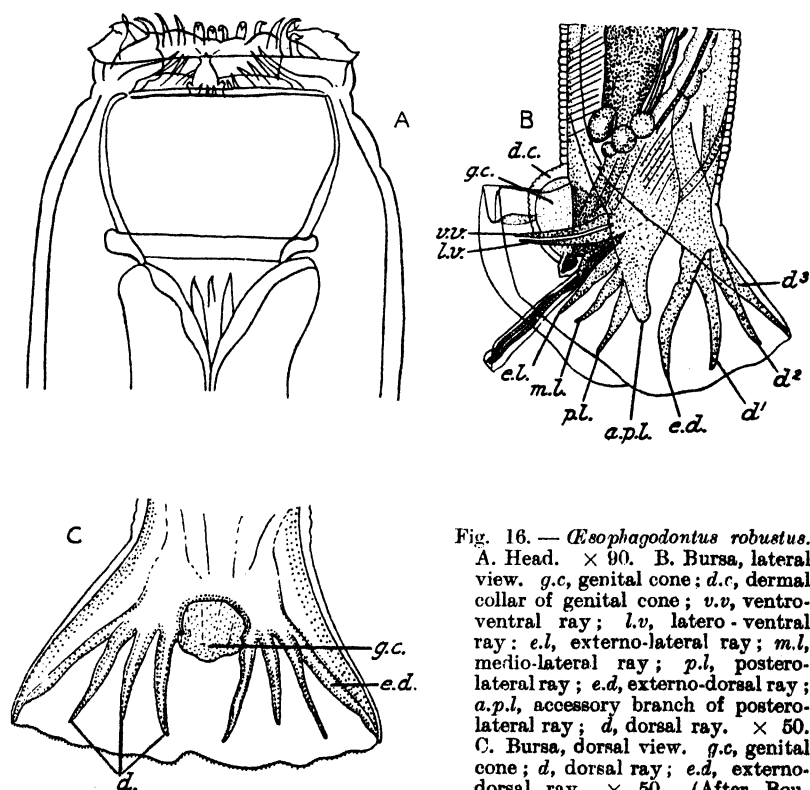


Fig. 16. — *Æsophagodontus robustus*. A. Head.  $\times 90$ . B. Bursa, lateral view. *g.c.*, genital cone; *d.c.*, dermal collar of genital cone; *v.v.*, ventro-ventral ray; *l.v.*, latero-ventral ray; *e.l.*, externo-lateral ray; *m.l.*, medio-lateral ray; *p.l.*, postero-lateral ray; *e.d.*, externo-dorsal ray; *a.p.l.*, accessory branch of postero-lateral ray; *d.*, dorsal ray; *d'*, dorsal ray; *d<sup>2</sup>*, dorsal ray; *d<sup>3</sup>*, dorsal ray.  $\times 50$ . C. Bursa, dorsal view. *g.c.*, genital cone; *d.*, dorsal ray; *e.d.*, externo-dorsal ray.  $\times 50$ . (After Boulenger.)

anterior margin ; œsophageal funnel well-developed, containing three lancets not projecting into the capsule, duct of dorso-œsophageal gland not prolonged into the buccal capsule as a dorsal ridge. Male : bursa with large lateral lobes but without a dorsal lobe ; with the following formula—ventral ray cleft, externo-

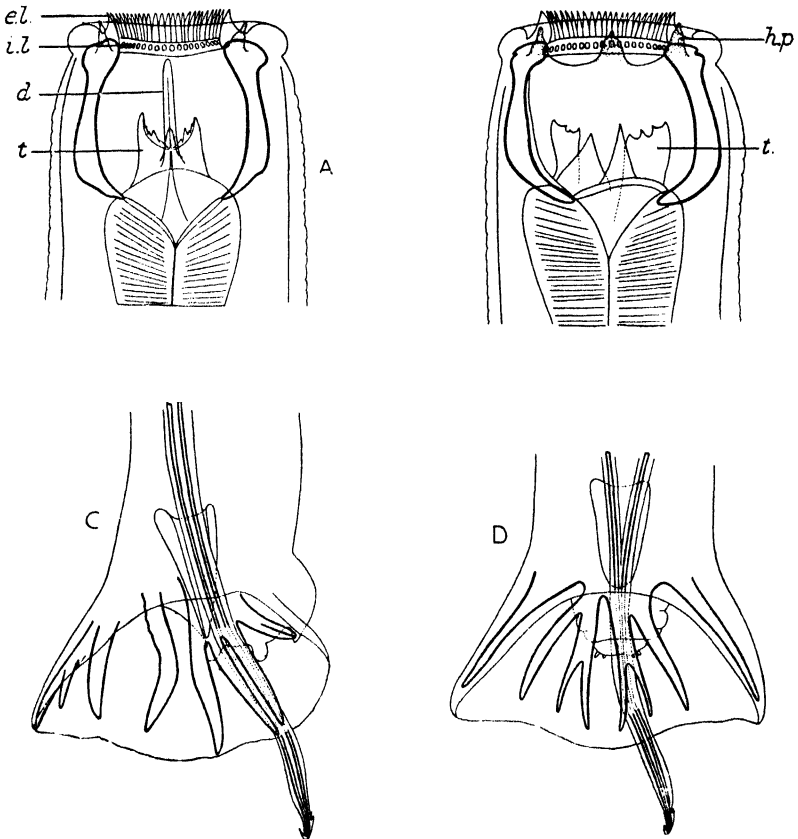


Fig. 17.—*Triodontophorus serratus*. A. Head, dorsal view. *e.l.*, external leaf-crown ; *i.l.*, internal leaf-crown ; *d.*, duct of dorsal œsophageal gland ; *t.*, œsophageal teeth.  $\times 160$ . B. Head, lateral view. *h.p.*, head papillæ ; *t.*, œsophageal teeth.  $\times 160$ . C. Bursa, lateral view.  $\times 28$ . D. Bursa, dorsal view.  $\times 28$ . (Orig.)

lateral and laterals arising from a common trunk, the postero-lateral giving off a short thick accessory branch, dorsal rays arising in two lateral groups, each consisting of four rays representing an externo-dorsal and three approximately equal dorsal rays ; spicules equal. Female : vulva near anus. Parasites of equines.

Type species : *O. robustus* (Giles, 1892). ♂ 13 mm., ♀ 22 mm. In equines.

Syn., *Sclerostoma robustum* Giles, 1892.

*Pseudosclerostomum securiferum* Quiel, 1919.

Refs. 61, 182, 232, 394, 414, 615.

Genus **TRIODONTOPHORUS** Looss, 1902.

Syn., *Triodontus* Looss, 1900, preoccupied.

*Definition.*—STRONGYLINÆ: mouth directed straight forwards with an external leaf-crown arising from mouth collar; buccal

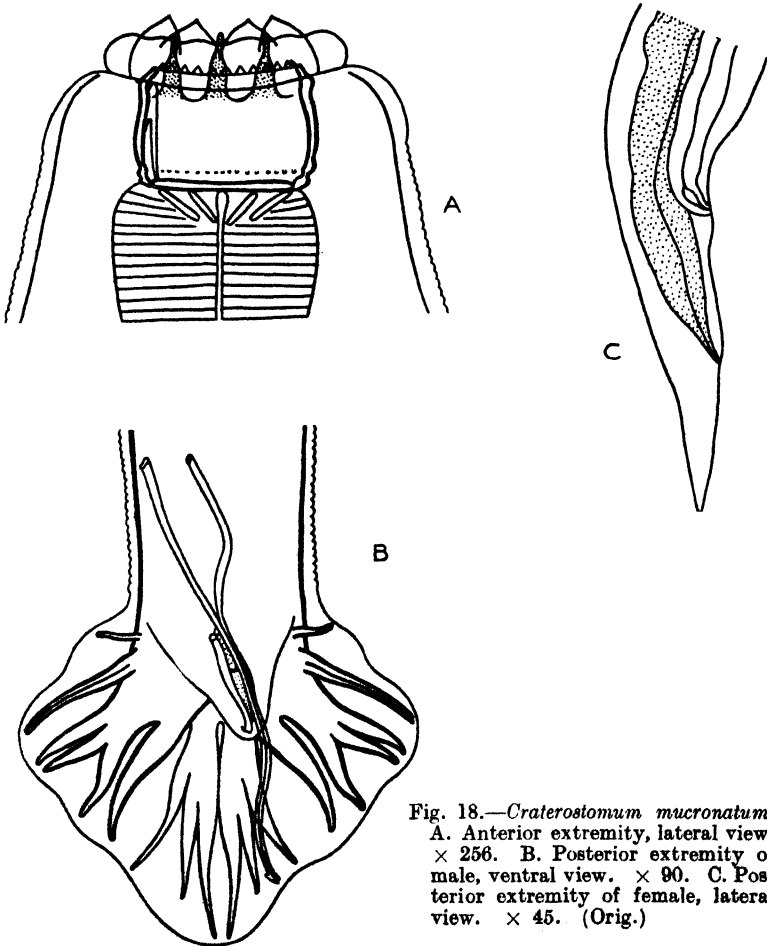


Fig. 18.—*Craterostomum mucronatum*.  
A. Anterior extremity, lateral view.  
× 256. B. Posterior extremity of  
male, ventral view. × 90. C. Pos-  
terior extremity of female, lateral  
view. × 45. (Orig.)

capsule subglobular, with an internal leaf-crown arising from its anterior margin and with three radially arranged teeth projecting into it from the oesophageal funnel, each tooth being composed

of two lamellæ converging towards the axis of the body and meeting at an obtuse angle. Male : bursal formula—ventral ray cleft, externo-lateral and laterals arising from a common trunk, externo-dorsal arising from a common trunk with the dorsal, dorsal cleft almost to its base, each limb giving off two lateral branches ; spicules equal ; gubernaculum present. Female : vulva close to anus. Parasites of equines.

Type species : *T. serratus* (Looss, 1900). ♂ 18 mm., ♀ 25 mm. In equines.

Syn., *Triodontus serratus* Looss, 1900.

*T. intermedius* Sweet, 1909.

Other species :

*T. brevicauda* Boulenger, 1916. In equines.

*T. minor* (Looss, 1900). In equines.

*T. tenuicollis* Boulenger, 1916. In equines.

Refs. 61, 232, 336, 338, 607, 615.

#### Genus CRATEROSTOMUM Boulenger, 1920.

*Definition*.—STRONGYLINÆ : closely allied to *Triodontophorus*, but differing in the absence of teeth projecting into the buccal capsule. Parasites of equines.

Type species : *C. acuticaudatum* (Kotlán, 1919). ♂ 9.5 mm., ♀ 9–11 mm. In equines.

Syn., *Cylicostomum acuticaudatum* Kotlán, 1919.

*Craterostomum tenuicauda* Boulenger, 1920.

Other species : *C. mucronatum* (Ihle, 1920). In equines.

Refs. 64, 232, 252, 615.

#### Genus CODIOSTOMUM Railliet and Henry, 1911.

*Definition*.—STRONGYLINÆ : mouth directed antero-dorsally with an external leaf-crown arising from the mouth collar and an internal leaf-crown arising from the anterior margin of the buccal capsule ; with 4 submedian and 2 lateral head papillæ ; buccal capsule subglobular with heavily chitinized walls and without teeth in its depth ; duct of dorsal œsophageal gland runs in a ridge in the wall of the capsule to open near its anterior margin. Male : bursa with a large dorsal lobe clearly marked off from the lateral lobes ; with the following formula—ventral rays close together, externo-lateral and laterals arising from a common trunk, externo-dorsal arises from a common trunk with the dorsal, dorsal bifurcate for more than half its length, each limb giving off



near its origin a lateral branch, which immediately subdivides into two divisions; spicules long and equal; gubernaculum present. Female: vulva near anus, and just in front of it is a prominent cuticular elevation; uteri parallel. Parasites of ostriches.

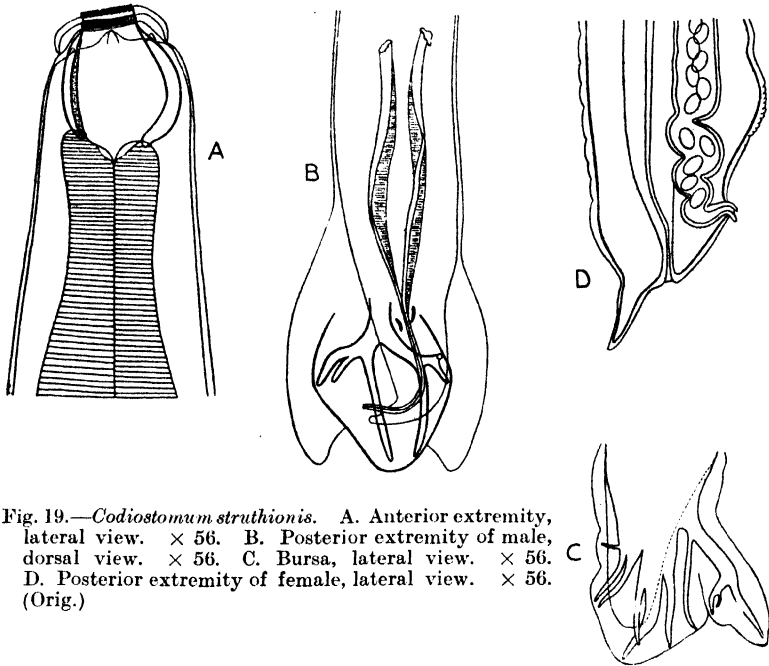


Fig. 19.—*Codistomum struthionis*. A. Anterior extremity, lateral view.  $\times 56$ . B. Posterior extremity of male, dorsal view.  $\times 56$ . C. Bursa, lateral view.  $\times 56$ . D. Posterior extremity of female, lateral view.  $\times 56$ . (Orig.)

Type species: *C. struthionis* (Horst, 1885). ♂ 13 mm., ♀ 23 mm. In *Struthio australis*.

Syn., *Sclerostoma struthionis* Horst, 1885.

Refs. 217, 362, 431.

**Genus CASTORSTRONGYLUS Chapin, 1925.**

**Definition.**—STRONGYLINÆ: mouth directed slightly dorsally, external leaf-crown arises from the mouth collar and consists of long fimbriated elements, internal leaf-crown arises from the anterior margin of the buccal capsule and consists of numerous short, stout elements; buccal capsule spherical with stout walls, and without teeth in its depth. Male: bursa with large lateral lobes and a small dorsal lobe; with the following formula—ventral rays cleft, externo-lateral arises from a common trunk with the other laterals, externo-dorsal arises separately from the dorsal,

dorsal bifurcated for about half its length, each limb being bidigitate ; spicules long, slender and somewhat twisted ; gubernaculum

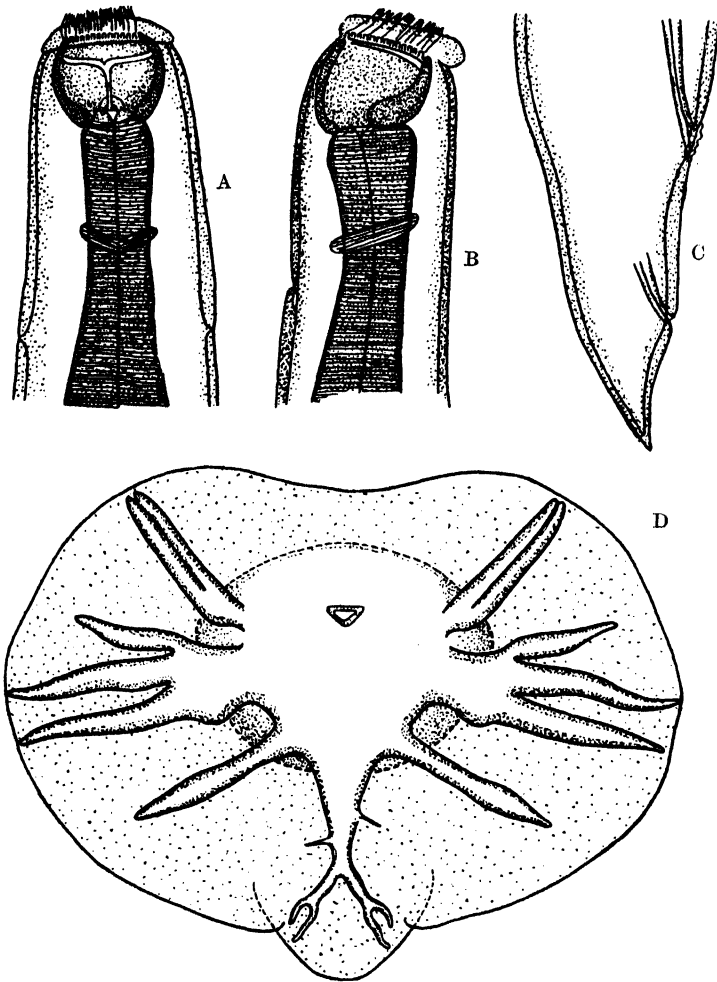


Fig. 20.—*Castorstrongylus castoris*. A. Anterior extremity, ventral view.  $\times 65$ . B. Anterior extremity, lateral view.  $\times 65$ . C. Tail of female, lateral view.  $\times 65$ . D. Bursa, ventral view.  $\times 130$ . (After Chapin.)

absent. Female : tail conical ; vulva near the anus. Oviparous. Parasites of rodents.

Type species : *C. castoris* (Chapin, 1925). ♂ 11 mm., ♀ 12 mm. In *Castor canadensis*.

Ref. 93b.

Genus **GLOBOCEPHALUS** Molin, 1861.

Syn., *Cystocephalus* Railliet, 1895.

*Characostomum* Railliet, 1902.

*Crassisoma* Alessandrini, 1909.

*Raillietostrongylus* Lane, 1923.

**Definition.**—**STRONGYLINÆ**: mouth directed antero-dorsally; buccal capsule more or less globular with very stout walls; sub-ventral lancets may or may not be present in the depth of the cavity, dorsal œsophageal ridge present and opening near the oral

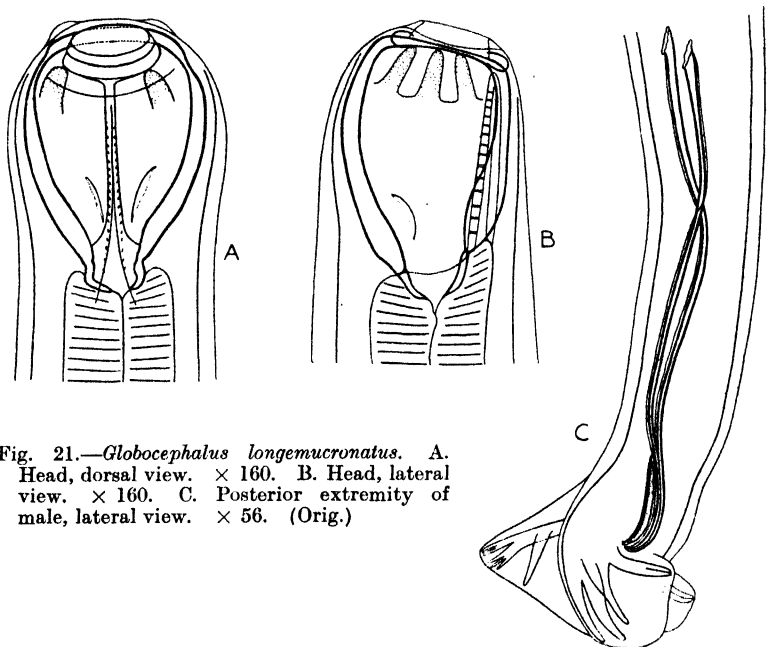


Fig. 21.—*Globocephalus longemucronatus*. A. Head, dorsal view.  $\times 160$ . B. Head, lateral view.  $\times 160$ . C. Posterior extremity of male, lateral view.  $\times 56$ . (Orig.)

margin of the capsule. Male: bursal formula—ventral ray cleft, externo-lateral and laterals arising from a common trunk, externo-dorsal arising from a common trunk with the dorsal, dorsal bifurcate, each branch tridigitate; spicules equal; gubernaculum present. Female: vulva a little behind the middle of the body; uteri opposed. Parasites of pigs and monkeys.

Type species: *G. longemucronatus* Molin, 1861. ♂ 7 mm., ♀ 8 mm. In pigs.

Syn., *Characostomum longemucronatum* (Molin, 1861) Railliet, 1902.

*Cystocephalus longemucronatus* (Molin, 1861) Railliet, 1895.

## Other species :

*G. asmilius* (Railliet, Henry, and Joyeux, 1913). In monkeys.  
Syn., *Characostomum asmilium* Railliet, Henry, and Joyeux,  
1913.

\**G. samoensis* (Lane, 1922). In pigs.

Syn., *Crassisoma samoense* Lane, 1922.

*Raillietostrongylus samoensis* (Lane, 1922) Lane, 1923.

*G. urosubulatus* (Alessandrini, 1909). In pigs.

Syn., *Crassisoma urosubulatum* Alessandrini, 1909.

*G. connorfilii* Lane, 1922.

Refs. 3, 84, 268, 269, 360, 402, 450, 656.

## Genus ACHEILOSTOMA Leiper, 1911.

*Definition*.—STRONGYLINÆ: mouth directed slightly dorsally with a well-developed mouth collar, which is not quite terminal and surrounds the anterior portion of the buccal capsule; this is globular with two subventral and two subdorsal triangular teeth in its depth; dorsal cone prominent and flanked by two sharp teeth. Male: lateral lobes of bursa much longer than the dorsal; bursal formula—ventral rays united almost to their tips, externo-lateral and lateral rays arising from a common trunk, externo-dorsal arises from a common trunk with the dorsal and is long and thin, dorsal bifurcate for about half its length or more, each branch being bidigitate; spicules long and equal; gubernaculum absent. Female: vulva about centre of body, uteri opposed.

Type species: *A. simpsoni* Leiper, 1911. ♂ 17 mm., ♀ 23 mm.  
In a large African rodent.

## Other species :

*A. moucheti* Railliet, 1918. In gall bladder of *Thryonomys swinderianus*.

*A. paranecator* Travassos and Horta, 1915. In intestine of *Equus asinus*.

Refs. 286, 409, 648.

## Subfamily STEPHANURINÆ Railliet, Henry, and Bauche, 1919.

*Definition*.—STRONGYLIDÆ: with a well-developed chitinous buccal capsule, the oral margin is not provided with teeth or other

\* Possibly *G. samoensis* Lane, 1922, is identical with *G. longemucronatus* Molin, 1861, practically the only difference being that in Molin's species subventral lancets are not figured in the buccal capsule, but these may easily have escaped observation. Lane (1925) in a recent paper upholds his original opinion that *Raillietostrongylus* is a valid genus characterized by the presence of "rudimentary subventral semilunes" guarding the oval aperture.

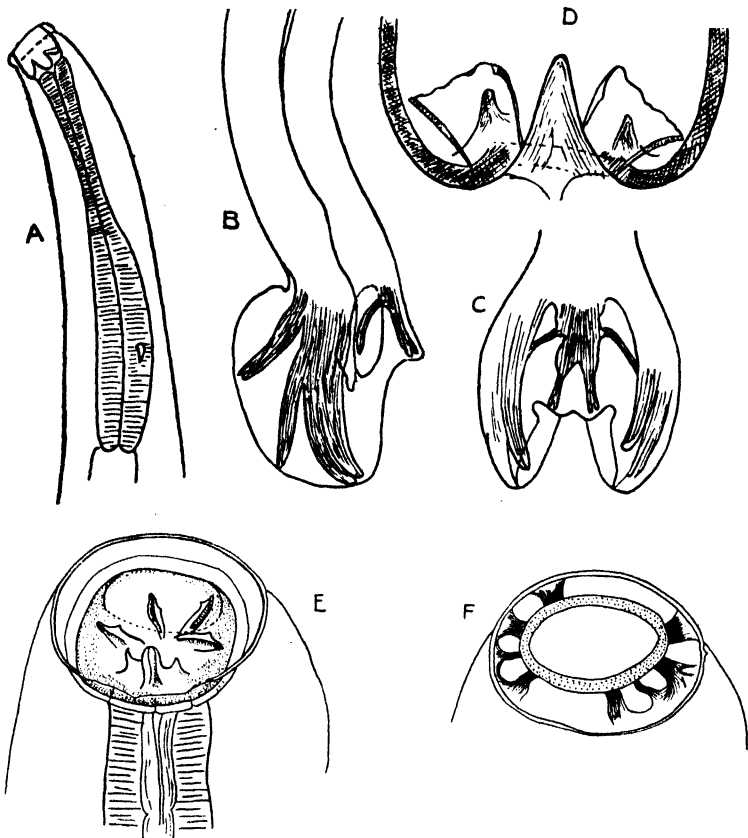


Fig. 22.—*Acheilostoma simpsoni*.—A. Anterior extremity, lateral view. B. Posterior extremity of male, lateral view. C. Bursa, dorsal view. D. Base of buccal capsule. (After Leiper.)

*Acheilostoma moucheti*. E. Head, dorsal surface, deep view.  $\times 150$ . F. Head, dorsal surface, superficial view.  $\times 150$ . (After Railliet.)

cutting organs, but with a rudimentary corona radiata. Bursa copulatrix very short and subterminal. Parasites of renal and perirenal tissue, and occasionally of the liver.

**Genus STEPHANURUS Dies., 1839.**

*Definition*.—STEPHANURINÆ: mouth circular and directed straight forwards; buccal capsule subglobular with thick walls, the anterior margin divided into six festoons, of which the dorsal and ventral are the most prominent, and furnished with a feebly-developed corona radiata; at the base of the capsule surrounding the orifice of the œsophagus are six to ten triangular teeth. Cephalic glands very voluminous and extend backwards about

half the length of the worm ; the gut is much longer than the worm and consequently is considerably convoluted. Male : bursa poorly-developed and placed subterminally ; with the follow-

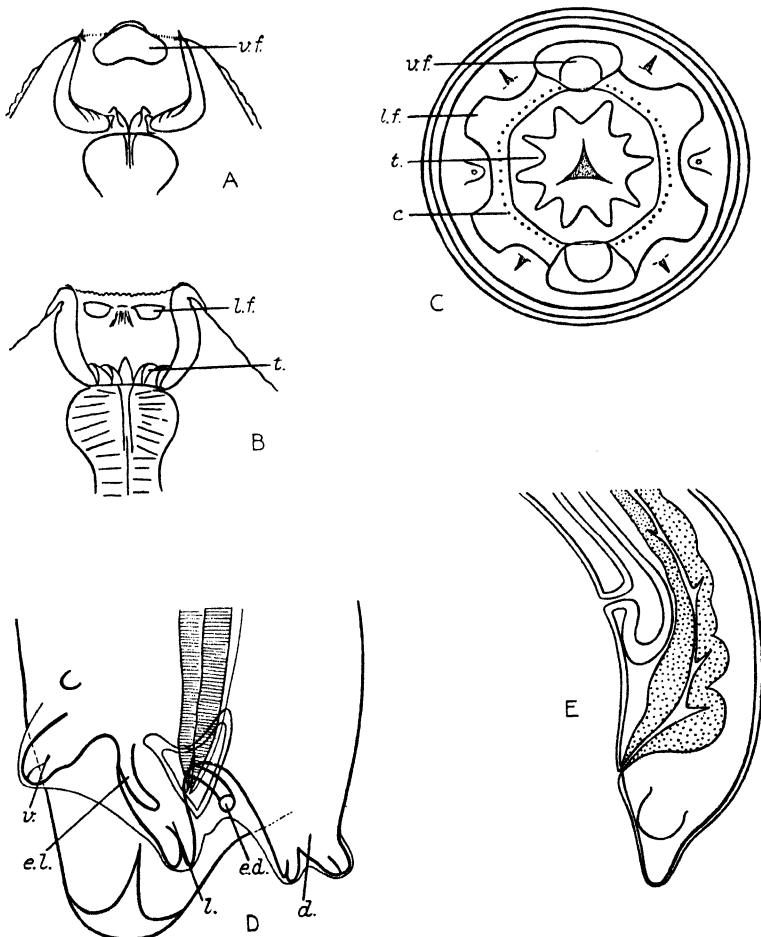


Fig. 23.—*Stephanurus dentatus*.—A. Head, ventral view. *v.f.*, ventral festoon.  $\times 65$ . B. Head, lateral view. *l.f.*, sub-lateral festoon; *t.*, teeth.  $\times 65$ . C. Head, end-on view. *v.f.*, ventral festoon; *l.f.*, sub-lateral festoon; *t.*, teeth at base of buccal capsule; *c.*, corona radiata.  $\times 100$ . D. Posterior extremity of male, lateral view. *v.*, ventral rays; *e.l.*, externo-lateral ray; *l.*, lateral rays; *e.d.*, externo-dorsal ray; *d.*, dorsal ray.  $\times 135$ . E. Posterior extremity of female.  $\times 24$ . (Orig.)

ing formula—ventral ray cleft, externo-lateral and other laterals arising from a common trunk, medio-lateral and postero-lateral thick and fused proximally, externo-dorsal arises separately from

the dorsal, dorsal thick and bifurcate in its distal portion, each branch bidigitate; spicules equal, or subequal, and winged; gubernaculum present. Female: vulva a little in front of the anus, posterior extremity bent ventrally, body narrows suddenly just behind anus and ends in a very small conical tail; there is a large sublateral papilla on each side of the anus. Parasites of renal and perirenal tissue of pigs.

Type species: *S. dentatus* Diesing, 1839. ♂ 22–30 mm., ♀ 34–40 mm. In pigs.

Syn., *Sclerostomum pinguicola* Verrill, 1870.

*S. nattereri* Cobbold, 1879.

*Sclerostomum renium* Drabble, 1922.

Refs. 53, 85, 103, 120, 122, 126, 449, 579, 612.

### Subfamily TRICHONEMINÆ Railliet, 1916.

Syn., *Cylicostominæ* Railliet, 1915.

*Definition.*—STRONGYLIDÆ: without a transverse ventral cervical groove; buccal capsule cylindrical and as a rule short or ring-shaped. Dorsal cesophageal ridge relatively short or absent, never reaching the anterior margin of the buccal capsule.

### KEY TO GENERA.

1. Mouth surrounded by prominent anteriorly directed digitiform processes . . . . . Labiostrongylus, p. 67.
- Mouth not surrounded by prominent digitiform processes . . . . . 2
2. Both sexes permanently spirally rolled . . . . . Spirostrongylus, p. 68.
- Not permanently spirally rolled . . . . . 3
3. Buccal capsule relatively enormously long . . . . . Cylindropharynx, p. 64.
- Buccal capsule relatively short . . . . . 4
4. With a long cylindrical vestibule with ringed walls . . . . . Pharyngostrongylus, p. 65.
- Without a vestibule . . . . . 5
5. Anterior end of œsophagus greatly dilated and chitinized . . . . . 6
- Anterior end of œsophagus not greatly dilated . . . . . 7

6. Chitinized œsophageal dilatation  
with three large crescentic  
teeth . . . . . Gyalocephalus, p. 62.  
Chitinized œsophageal dilatation  
covered with small papillæ . . . . . Trachypharynx, p. 63.
7. Mouth cavity much smaller than  
buccal capsule from which it  
is separated by parenchyma . . . . . 8  
Mouth cavity not separated  
from buccal capsule by paren-  
chyma . . . . . 9
8. Leaf-crown consists of 10-18  
prominent elements . . . . . Quilonia, p. 71.  
Leaf-crown rudimentary . . . . . Paraquilonia, p. 74.
9. Mouth collar absent, submedian  
head papillæ absent or atro-  
phied . . . . . Buissonia, p. 80.  
Mouth collar and submedian  
head papillæ present . . . . . 10
10. Buccal capsule divided trans-  
versely into anterior and  
posterior portions . . . . . Bourgelatia, p. 82.  
Buccal capsule not divided into  
anterior and posterior portions . . . . . 11
11. Œsophageal cuticle provided  
with numerous rose - thorn  
like spines; intestinal diver-  
ticula present . . . . . Sauricola, p. 61.  
Œsophageal cuticle not provided  
with rose-thorn like spines;  
intestinal diverticula absent . . . . . 12
12. Elements of leaf-crown much  
longer laterally than dorsally  
and ventrally, so that the  
mouth opening when viewed  
from the anterior aspect is  
slit-like and when viewed  
laterally is crescentic . . . . . Murshidia, p. 78.  
Elements of leaf-crown all of  
approximately the same  
length, so that the mouth  
opening is circular or oval in  
shape. . . . . 13



13. Bursa closed ventrally by a ventral lobe clearly marked off from the lateral lobes . . . . . Macropostrongylus, p. 75.  
 Bursa not closed ventrally by a ventral lobe . . . . . 14
14. With a single leaf-crown arising from the base of the buccal capsule . . . . . 15  
 With two leaf-crowns, the external arising from the mouth collar and the internal from the buccal capsule . . . . . 16
15. Leaf-crown consists of only six elements ; bursa with an extra lateral ray . . . . . Kiluluma, p. 70.  
 Leaf-crown consists of numerous elements ; bursa without an extra lateral ray . . . . . Theileriana, p. 76.
16. Œsophagus hour-glass shaped ; bursa with the externo-lateral and lateral rays all very close together . . . . . Amira, p. 82.  
 Œsophagus not hour-glass shaped ; bursa with the externo-lateral and lateral rays not very close together . . . . . 17
17. Dorsal ray of bursa cleft to base Trichonema, p. 54.  
 Dorsal ray of bursa cleft for only half its length . . . . . Poteriosomum, p. 60.
18. Insufficiently known . . . . . Eucyathostomum, p. 84.

Genus **TRICHONEMA** Cobbold, 1874.

Syn., *Cyathostomum* Molin, 1861 ; not *Cyathostoma* Blanchard, 1849.

*Cylicostomum* Railliet, 1901.

*Cylicnostomum* Looss, 1901.

*Definition*.—**TRICHONEMINÆ**: mouth directed straight forwards, it may be circular or ellipsoidal with the long axis either dorso-ventrally or laterally ; two leaf-crowns the elements of which vary greatly in size and shape in the different species ; buccal capsule more or less cylindrical, likewise varying greatly in size and shape in the different species ; only very occasionally

are small triangular lancets present at the base of the capsule. Duct of dorsal oesophageal gland may or may not project into the buccal capsule. Male: bursal formula—ventral ray cleft, externo-lateral and laterals arising from a common trunk, externo-dorsal arising separately from the dorsal, dorsal cleft to the base, each branch giving off two lateral branches or very occasionally three;

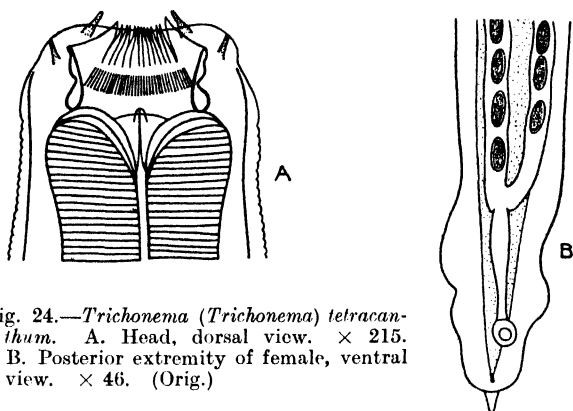


Fig. 24.—*Trichonema (Trichonema) tetracanthum*. A. Head, dorsal view.  $\times 215$ . B. Posterior extremity of female, ventral view.  $\times 46$ . (Orig.)

spicules equal; gubernaculum present. Female: vulva near anus; uteri parallel; posterior extremity varies greatly in shape. Parasites of equines.

Type species: *T. tetracanthum* (Mehlis, 1831, of Looss, 1900).  $\sigma$  9 mm.,  $\phi$  10–12 mm. In equines.

Syn., *Cylichnostomum tetracanthum* Mehlis, 1831, of Looss, 1900.

*T. ægyptiacum* Railliet, 1923.

Other species:

*T. adersi* (Boulenger, 1920).

*T. alveatum* (Looss, 1900).

*T. asymmetricum* (Theiler, 1923).

*T. auriculatum* (Looss, 1900).

*T. barbatum* (Smit and Noto-soediro, 1923).

*T. bicoronatum* (Looss, 1900).

*T. bidentatum* (Ihle, 1925).

*T. brevicapsulatum* (Ihle, 1920).

*T. calicatum* (Looss, 1900).

*T. catinatum* (Looss, 1900).

*T. catinatum* var. *litoraurea* (Yorke and Macfie, 1920).

*T. catinatum* var. *pseudocatinata* (Yorke and Macfie, 1919).

*T. coronatum* (Looss, 1900).

- T. elongatum* (Looss, 1900).  
*T. elongatum* var. *kotláni* (Ihle, 1920).  
 Syn., *C. elongatum* var. *macrobursata* Kotlán, 1920.  
*T. euproctum* (Boulenger, 1917).  
*T. goldi* (Boulenger, 1917).  
 Syn., *T. tridentatum* (Yorke and Macfie, 1920).  
*T. hybridum* (Kotlán, 1920).  
*T. insigne* (Boulenger, 1917).  
 Syn., *T. zebrae* (Boulenger, 1920).  
*T. labiatum* (Looss, 1901).  
*T. labiatum* var. *digitata* (Ihle, 1921).  
*T. labratum* (Looss, 1900).  
*T. leptostomum* (Kotlán, 1920).  
*T. longibursatum* (Yorke and Macfie, 1918).  
 Syn., *Cylicostomum longibursatum* Yorke and Macfie, 1918.  
*Cylicostomum calicatifforme* Kotlán, 1919.  
*Cylicostomum nanum* Ihle, 1919.  
*T. mettami* (Leiper, 1913).  
 Syn., *T. ihlei* (Kotlán, 1921).  
*T. minutum* (Yorke and Macfie, 1918).  
 Syn., *C. calicatum* var. *minor* Kotlán, 1920.  
*T. montgomeryi* (Boulenger, 1920).  
*T. nassatum* (Looss, 1900).  
*T. nassatum* var. *parva* (Yorke and Macfie, 1918).  
 Syn., *T. ashworthi* Le Roux, 1924.  
*T. ornatum* (Kotlán, 1919).  
*T. pateratum* (Yorke and Macfie, 1919).  
 Syn., *T. cymatostomum* Kotlán, 1919.  
*T. poculatum* (Looss, 1900).  
*T. prionodes* (Kotlán, 1921).  
*T. radiatum* (Looss, 1900).  
*T. sagittatum* (Kotlán, 1920).  
*T. triramosum* (Yorke and Macfie, 1920).  
*T. ultrajectinum* (Ihle, 1920).

The genus has been divided into subgenera by Ihle (1922-1925) and the subdivision subsequently modified as follows by Le Roux (1924), and by Cram (1924).

**Subgenus TRICHONEMA** \* (Cobbold, 1874) ; not Le Roux, 1924.

Syn., *Cylicostomum* (Railliet, 1901) Ihle, 1922.

*Definition*.—The external leaf-crown consists of 18–24 elements, mostly pointed ; those of the internal crown are thin triangular plates placed radially, and arising from the internal surface of the mouth capsule some

\* Cram has raised this to a genus, viz. : *Cylicostomias* Cram, 1925.

distance from its anterior margin; "problematic structure" of Looss in the mouth collar present. Mouth capsule rather short, thick-walled. Posterior extremity of the body of the female straight or slightly bent dorsally. Contains the species: *tetracanthum* of Looss, *coronatum*, *labiatum*, *labratum*, *ornatum*, and *sagittatum*.

Subgenus **CYLICOSTEPHANUS** Ihle, 1922.

Syn., *Trichonema* (Cobbold, 1874) Le Roux, 1924.

**Definition.**—Mouth opening circular, mouth collar depressed, external leaf-crown consists of 8–18 elements (ca. 35 in *C. poculatum*). Mouth capsule generally long and cylindrical or somewhat narrower anteriorly

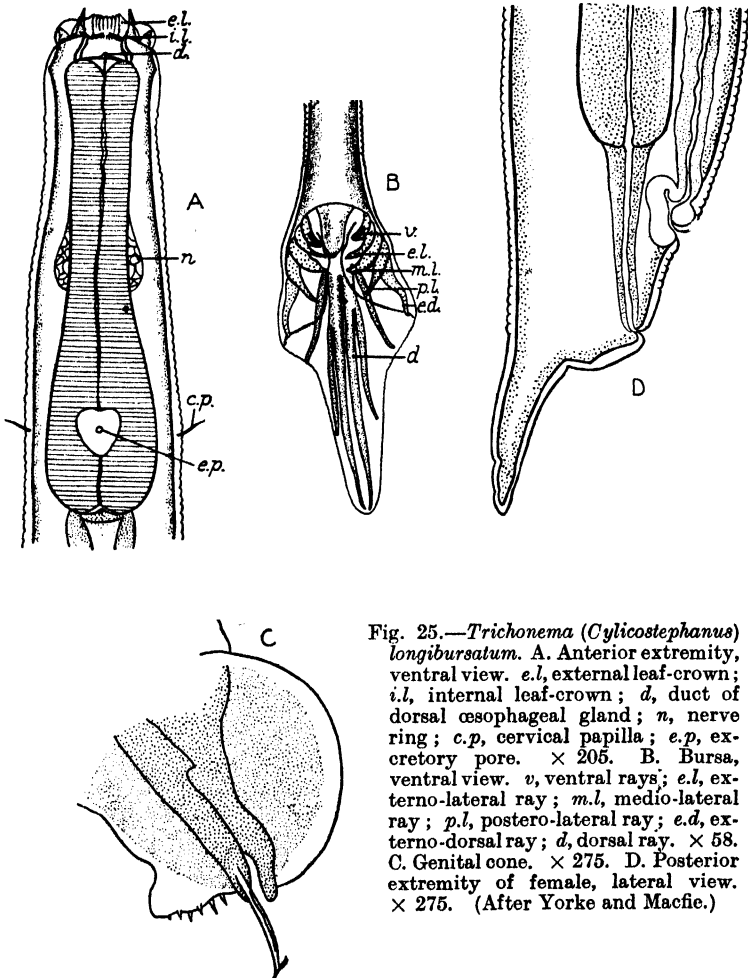


Fig. 25.—*Trichonema* (*Cylicostephanus*) *longibursatum*. A. Anterior extremity, ventral view. *e.l.*, external leaf-crown; *i.l.*, internal leaf-crown; *d.*, duct of dorsal oesophageal gland; *n.*, nerve ring; *c.p.*, cervical papilla; *e.p.*, excretory pore.  $\times 205$ . B. Bursa, ventral view. *v.*, ventral rays; *e.l.*, external-lateral ray; *m.l.*, medio-lateral ray; *p.l.*, postero-lateral ray; *e.d.*, externo-dorsal ray; *d.*, dorsal ray.  $\times 58$ . C. Genital cone.  $\times 275$ . D. Posterior extremity of female, lateral view.  $\times 275$ . (After Yorke and Macfie.)

than posteriorly. The elements of the internal leaf-crown are short rods arising from near the anterior margin of the mouth capsule. Posterior extremity of the female mostly straight. Contains the species: *calicatum*, *barbatum*, *hybridum*, *longibursatum*, *minutum*, and *poculatum*.

**Subgenus CYLICOCERCUS Ihle, 1922.**

*Definition.*—The external leaf-crown consists of 20–29 elements, the elements of the internal crown resemble those of the subgenus *Trichonema*; their point of origin is sometimes far back in the capsule. Posterior

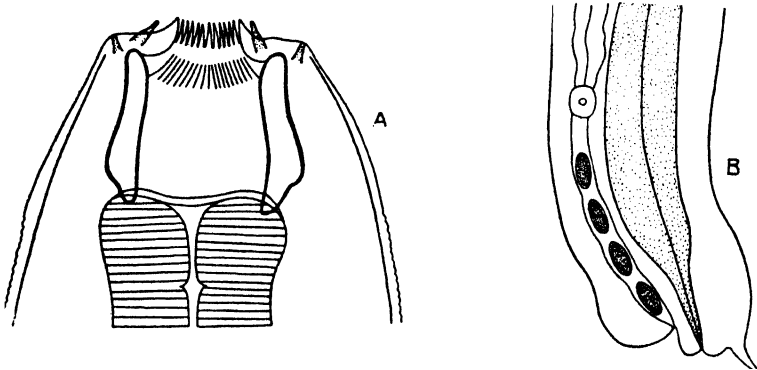


Fig. 26.—*Trichonema* (*Cylicocercus*) *alveatum*. A. Head, ventral view.  $\times 215$ . B. Posterior extremity of female, lateral view.  $\times 46$ . (Orig.)

extremity of the female strongly bent dorsally, with a swelling in front of the vulva, so as to resemble a human foot when seen laterally. Contains the species: *alveatum*, *catinatum*, *goldi*, and *pateratum*.

**Subgenus CYLICOCYCLUS Ihle, 1922.**

*Definition.*—The posterior margin of the mouth capsule has a hoop-like thickening, the elements of the internal leaf-crown are usually small and numerous; they are generally fine rods, originating near the anterior

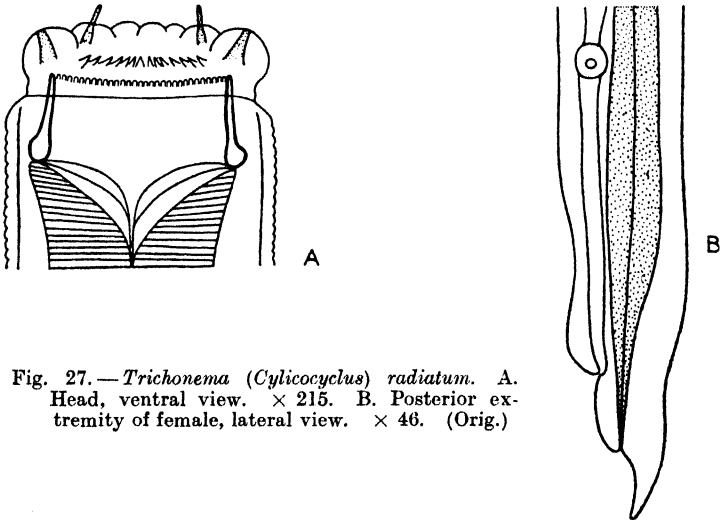


Fig. 27.—*Trichonema* (*Cylicocyclus*) *radiatum*. A. Head, ventral view.  $\times 215$ . B. Posterior extremity of female, lateral view.  $\times 46$ . (Orig.)

margin of the mouth capsule. The posterior extremity of the female is usually straight or slightly bent dorsally, rarely greatly bent dorsally. Contains the species: *radiatum*, *adersi*, *auriculatum*, *elongatum*, *insigne*, *leptostomum*, *nassatum* and *triramosum*.

**Subgenus CYLICODONTOPHORUS Ihle, 1922.**

*Definition.*—Submedian papillæ generally conical, their distal part mostly small and globular; elements of the external leaf-crown generally small and numerous, those of the internal leaf-crown very large and broad consisting of plates radially arranged and arising close to the anterior

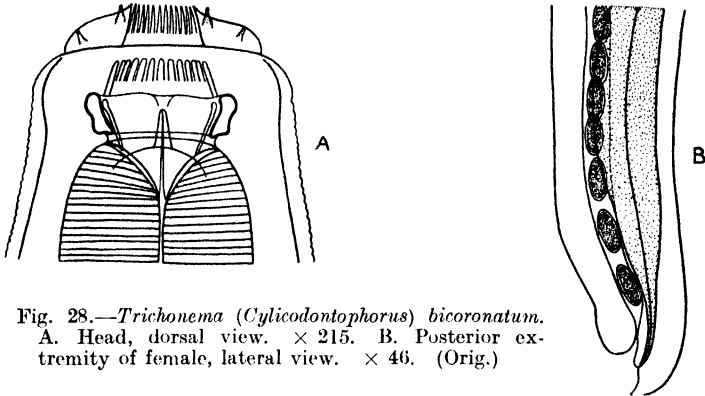


Fig. 28.—*Trichonema (Cyclicodontophorus) bicoronatum*.  
A. Head, dorsal view.  $\times 215$ . B. Posterior extremity of female, lateral view.  $\times 46$ . (Orig.)

margin of the buccal capsule. Mouth capsule short and wide, thick-walled. Posterior extremity of the female generally straight; anus and vulva often some distance apart. Contains the species: *bicoronatum*, *euproctum*, *mettami*, and *ultrajectinum*.

**Subgenus CYLICOTETRAPEDON Ihle, 1925.**

*Definition.*—The external leaf-crown consists of 15 or 16 elements; those of the internal leaf-crown are short and broad; the wall of the mouth capsule is thicker anteriorly than posteriorly and somewhat larger ventrally than dorsally. Posterior extremity of female straight. Contains the species *bidentatum* and *asymmetricum*.

The subdivision of this genus was first attempted by Ihle (1922) who based his effort on the assumption that the correct name for the genus is *Cylicostomum* and not *Trichonema*. Railliet (1923) endeavoured to show that *Strongylus tetracanthus* Mehlis, 1831, is *T. insigne* (Boulenger, 1917) and not *T. tetracanthum* (Mehlís of Looss, 1900); but as Le Roux (1924) has pointed out there is no more justification for this than for Looss' assumption that his Egyptian worm was the same as that described by Mehlís.

Le Roux considers that as *Strongylus tetracanthus* Mehlís, 1831, cannot be identified with certainty it automatically ceases to be the type of the genus *Trichonema*, and that *Str. tetracanthus* Mehlís of Looss assumes the name *Trichonema ægyptiacum* Railliet, 1923; he accordingly designates *Cylicostomum longibursatum* Yorke and Macfie, 1918, as the type of the genus *Trichonema*. This, however, is contrary to the International Code and it seems to us desirable to retain *Cylichnostomum tetracanthum* Mehlís of Looss, 1900, as the type of the genus *Trichonema*.

Cram (1924) has unfortunately still further complicated matters by raising Ihle's subgenera to generic rank, and has added two more to the list, viz., *Cylicotoichus* Cram, 1924, in which the dorsal and ventral walls of the mouth capsule are much higher than the lateral walls, containing the species *montgomeryi*; and *Cylicobrachytus* Cram, 1924, for those *Trichonema* in which the mouth capsule is extremely short, and the elements of the internal leaf-crown are either inconspicuous or absent, containing the species *prionodes* and *brevicapsulatum*.

Refs. 62, 101, 111a, 111d, 220, 223, 224, 225, 227, 228, 230, 231, 232, 234, 235, 236a, 252, 253, 292, 336, 338, 351a, 412, 473, 582c, 615, 671, 673, 674, 676, 678.

**Genus POTERIOSTOMUM** Quiel, 1919.

Syn., *Hexodontostomum* Ihle, 1920.

*Definition.*—TRICHONEMINÆ: closely resembles *Trichonema*, differing from this genus in the arrangement of the dorsal rays of

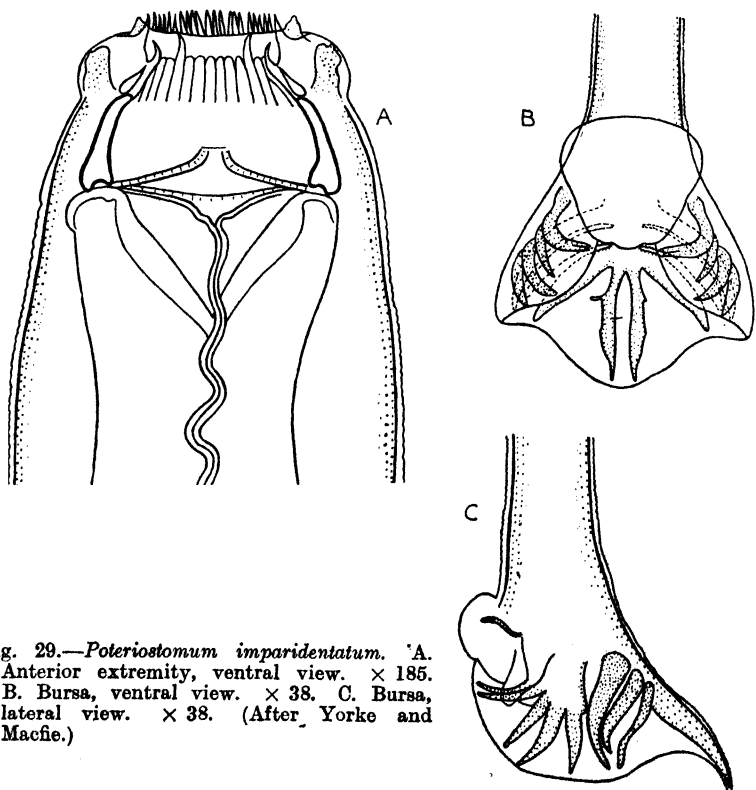


Fig. 29.—*Poteriosomum imparidentatum*. 'A. Anterior extremity, ventral view.  $\times 185$ . B. Bursa, ventral view.  $\times 38$ . C. Bursa, lateral view.  $\times 38$ . (After Yorke and Macfie.)

the bursa, which is as follows—externo-dorsal ray arises from a common trunk with the dorsal, the main trunk of the dorsal ray is not cleft to its base, but only for about half its length, the two lateral branches arising from the undivided portion close to the point of origin of the externo-dorsal. Parasites of equines.

Type species: *P. imparidentatum* Quiel, 1919. ♂ 14 mm., ♀ 14–20 mm. In equines.

Syn., *P. pluridentatum* Quiel, 1919.

*Hexodontostomum markusi* Ihle, 1920.

*Cylichnostomum zebrae* Turner, 1920.

Other species:

*P. rátzii* (Kotlán, 1919). In equines.

*P. rátzii* var. *nana* Theiler, 1923.

Refs. 222, 225, 232, 252, 393, 615, 675.

Genus **SAURICOLA** Chapin, 1924.

Syn., *Echinopharynx* Thapar, 1925.

*Definition*.—**TRICHONEMINÆ**: mouth directed straight forwards; buccal capsule very short, cylindrical or ring-shaped, and cut up

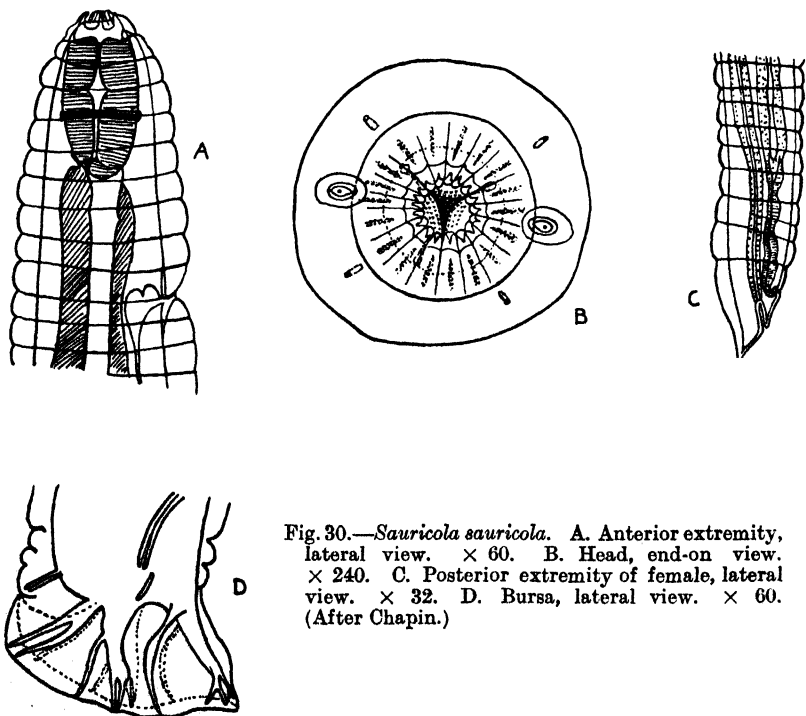


Fig. 30.—*Sauricola sauricola*. A. Anterior extremity, lateral view.  $\times 60$ . B. Head, end-on view.  $\times 240$ . C. Posterior extremity of female, lateral view.  $\times 32$ . D. Bursa, lateral view.  $\times 60$ . (After Chapin.)



into 36 distinct segments ; arising from the capsule is the corona-radiata consisting of 36 elements. Œsophagus very short and stout, and the cuticular lining is provided with numerous rose-thorn shaped spines. Intestine with a very thick cuticular lining and provided with three pocket-shaped diverticula directed posteriorly. Male : bursa well-developed ; with the following formula—ventro-ventral and ventro-lateral rays separate and parallel, externo-lateral and other laterals arising from a common trunk, the medio-lateral and postero-lateral separate in their distal portion only, and from the latter a short branch is directed posteriorly, externo-dorsal arises from the base of the dorsal, dorsal bifurcate in its distal portion, each branch being bidigitate ; preventral rays present ; spicules long, slender and simple ; gubernaculum present. Female : vulva near anus ; uteri parallel. Oviparous, eggs oval with thin shells. Parasites of reptiles.

Type species : *S. sauricola* Chapin, 1924. ♂ 7-7.5 mm., ♀ 8-10 mm. In *Testudo denticulata* (*T. tabulata*).

Other species : \**S. echinopharynx* (Thapar, 1925). In *Testudo tabulata*.

Syn., *Echinopharynx echinopharynx* Thapar, 1925.

Refs. 92, 613a.

#### Genus GYALOCEPHALUS Looss, 1900.

*Definition.*—TRICHONEMINÆ : mouth directed straight forward with an external leaf-crown arising from the mouth collar ; buccal capsule short with an internal leaf-crown. Anterior end of the œsophagus enormously dilated and chitinous, and containing three large crescentic teeth which project forward into the buccal capsule. Male : bursal formula—ventral, externo-lateral and lateral rays arise from a common trunk, externo-dorsal arises separately from the dorsal, dorsal split almost to its base, each limb giving off two lateral branches : well-marked preventral rays ; spicules equal ; gubernaculum present. Female : vulva near anus ; posterior extremity straight and conical. Parasites of equines.

Type species : *G. capitatus* Looss, 1900. ♂ 7.5 mm., ♀ 9-10 mm. In equines.

Other species : *G. equi* Yorke and Macfie, 1918. In equines.

Refs. 232, 336, 338, 615, 672.

\* Possibly this species is identical with *S. sauricola*, but the spicules are stated by Thapar to be 4.05 mm. in length as compared with 2.36 mm. in *S. sauricola*.

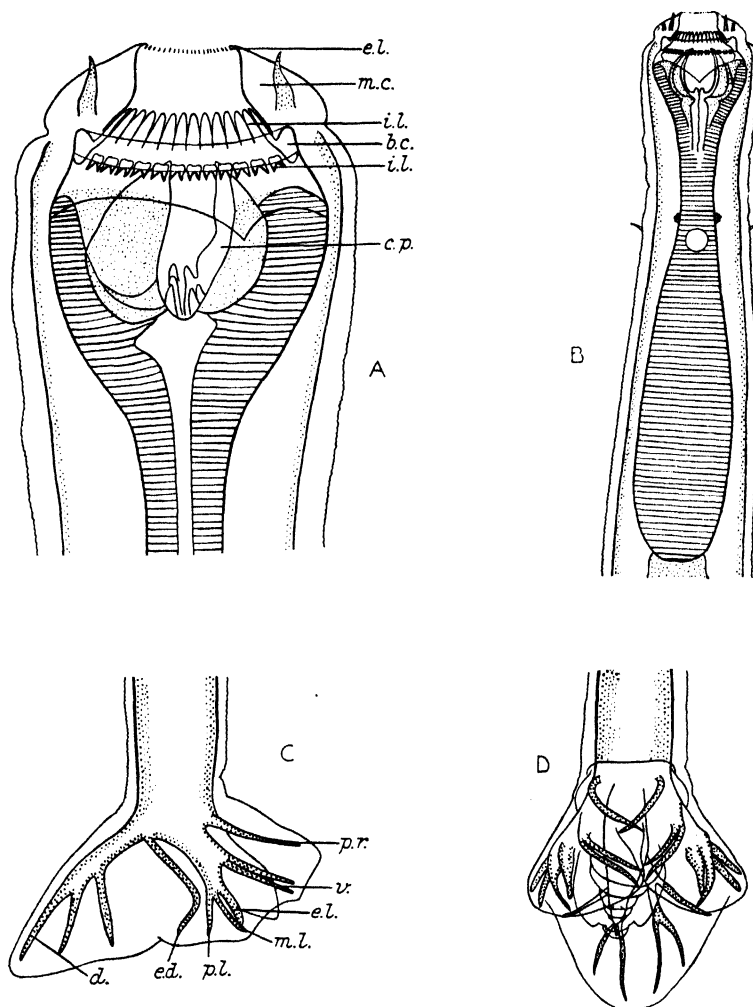


Fig. 31.—*Gyalocephalus capitatus*. A. Head, lateral view. *e.l.*, external leaf-crown; *m.c.*, mouth collar; *i.l.*, internal leaf-crown; *b.c.*, buccal capsule; *c.p.*, crescentic plates.  $\times 185$ . B. Anterior extremity, ventral view.  $\times 62$ . C. Bursa, lateral view. *p.r.*, pre-ventral ray; *v.*, ventral rays; *e.l.*, externo-lateral ray; *m.l.*, medio-lateral ray; *p.l.*, postero-lateral ray; *e.d.*, externo-dorsal ray; *d.*, dorsal ray.  $\times 62$ . D. Bursa, ventral view.  $\times 62$ . (After Yorke and Macfie.)

Genus **TRACHYPHARYNX** Leiper, 1911.

**Definition.**—TRICHONEMINÆ: mouth directed straight forward, two leaf-crowns; buccal capsule short; anterior end of œsophagus greatly dilated, and lined by cuticle having a large number of rounded knobs. Male: undescribed. Female: vulva a short distance in front of the anus.

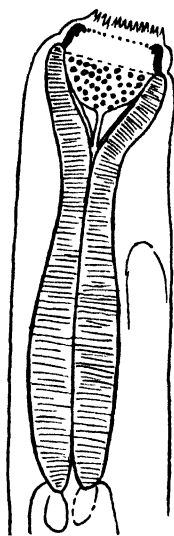


Fig. 32.—*Trachypharynx nigeriæ*. Anterior extremity, lateral view. (After Leiper.)

Type species : *T. nigeriæ* Leiper, 1911. ♂ 11 mm., ♀ 15 mm.  
In a large West African rodent.

Refs. 205, 286.

**Genus CYLINDROPHARYNX Leiper, 1911.**

*Definition*.—TRICHONEMINÆ : mouth directed straight forward ; the external leaf-crown which arises from the mouth collar is greatly modified and consists of six large elements corresponding to the head papillæ, dorsally and ventrally it is deficient, but from each of the prominent dorsal and ventral lips of the mouth collar there projects horizontally inwards a broad crescentic plate ; buccal capsule extremely long and cylindrical, with an internal leaf-crown at its anterior margin. Male : bursal formula—ventral ray cleft, externo-lateral and laterals arise from a common trunk, externo-dorsal arising separately from the dorsal, dorsal doubled, each limb giving off one lateral branch, the extremity of which may be bifurcated ; spicules long, stout and barbed at their extremity. Female : vulva a short distance in front of the anus. Parasites of zebras.

Type species : *G. brevicauda* Leiper, 1911. ♂ 5–7 mm., ♀ 6–8 mm.  
In zebra.

Other species :

*C. intermedia* Theiler, 1923. In zebra.

*C. longicauda* Leiper, 1911. In zebra.

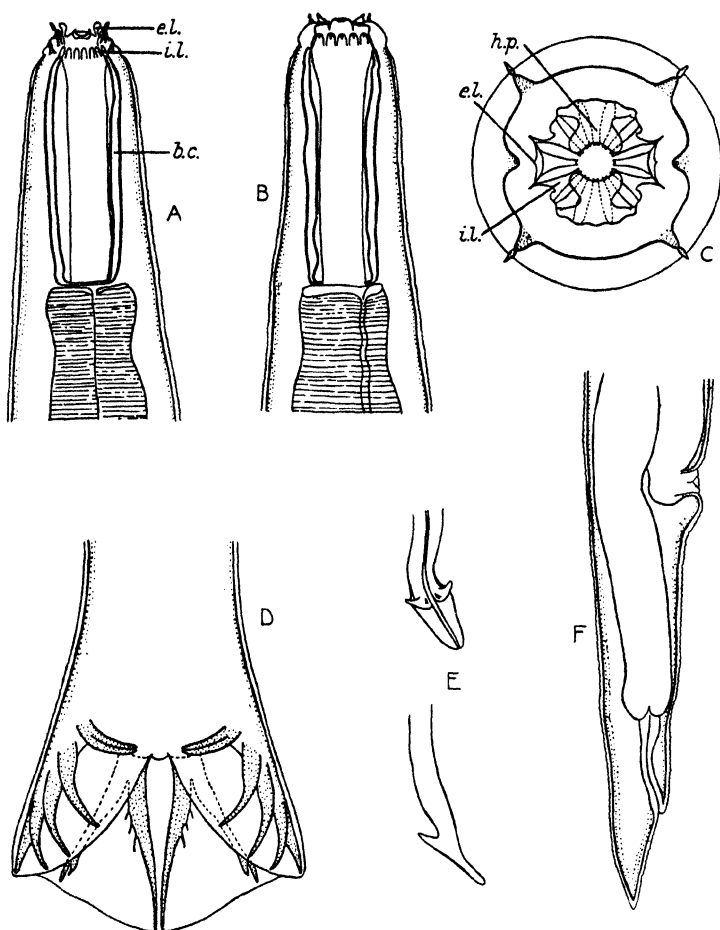


Fig. 33.—*Cyliindropharynx rhodesiensis*. A. Anterior extremity, ventral view. *e.l.*, external leaf-crown; *i.l.*, internal leaf-crown; *b.c.*, buccal capsule.  $\times 58$ . B. Anterior extremity, lateral view.  $\times 58$ . C. Head, end-on view. *h.p.*, horizontal crescentic plate; *e.l.*, external leaf-crown; *i.l.*, internal leaf-crown.  $\times 185$ . D. Bursa, ventral view.  $\times 58$ . E. Ends of spicules.  $\times 280$ . F. Posterior extremity of female, lateral view.  $\times 30$ . (After Yorke and Macfie.)

*C. ornata* Cram, 1924. In zebra.

*C. rhodesiensis* Yorke and Macfie, 1920. In zebra.

Refs. 64, 111a, 232, 286, 615, 677.

#### Genus PHARYNGOSTRONGYLUS n. g.

*Definition*.—TRICHONEMINÆ: body tapering gradually anteriorly, head directed straight forwards, mouth collar with two

large broad lateral papillæ and four smaller submedian head papillæ. Cuticle smooth with a few fine striations anteriorly; buccal capsule short and cylindrical with walls concave outwards. Corona radiata arising from near the anterior end of the buccal capsule; the buccal capsule leads into a long cylindrical vestibule, with heavily chitinized ringed walls, which opens obliquely into

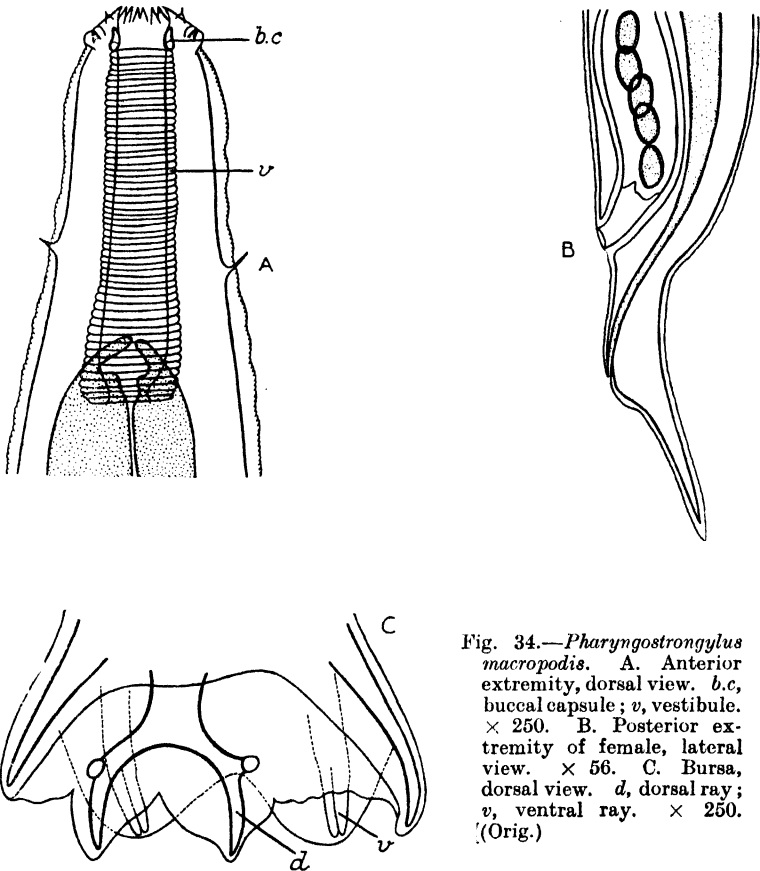


Fig. 34.—*Pharyngostrongylus macropodis*. A. Anterior extremity, dorsal view. *b.c.*, buccal capsule; *v*, vestibule.  $\times 250$ . B. Posterior extremity of female, lateral view.  $\times 56$ . C. Bursa, dorsal view. *d*, dorsal ray; *v*, ventral ray.  $\times 250$ . (Orig.)

the œsophagus the dorsal walls being longer than the ventral; œsophagus very long and slender; cervical papillæ long and thin, situated over the posterior part of the vestibule; excretory pore behind the nerve ring about the end of the anterior fourth of œsophagus. Male: bursa very short and closed ventrally, with lateral lobes clearly marked off from the ventral and dorsal lobes; with the following formula—ventral ray cleft in the distal part,

externo-lateral, lateral and externo-dorsal all arise from a common trunk, medio-lateral and postero-lateral fused except in the distal portion, dorsal divided almost to its base, each limb giving off a short external appendage; spicules long, thin, and striated with simple points; gubernaculum present. Female: posterior extremity narrows suddenly behind the vulva and again behind the anus to end in a conical tail; vulva a little distance in front of the anus; uteri parallel. Oviparous. Parasites of marsupials.

Type species: \**P. macropodis* n. sp. ♂ 11–12 mm., ♀ 14–17 mm. In *Macropus* sp.

#### Genus LABIOSTRONGYLUS n. g.

*Definition.*—TRICHONEMINÆ: large stout worms; mouth directed straight forwards and surrounded by 4 very large bilobed processes arranged submedianly, by a large simple process on each side, and by a smaller process dorsally and ventrally; buccal capsule large and cylindrical of rather greater diameter laterally than antero-posteriorly; oesophagus long and rather slender. Male: bursa with lateral lobes clearly marked off from the dorsal lobe and also from two large ventral lobes, each of which is supported by a ventral ray; with the following formula—ventral ray cleft distally, externo-lateral very short and arising from a common trunk with the laterals and externo-dorsal, lateral long, cleft distally and reaching the apex of the lateral lobes, externo-dorsal very short, dorsal divided for about half its length, and from the common trunk a long branch is given off on each side; spicules long, thin, and striated, with simple points; gubernaculum present. Female: posterior extremity tapers regularly behind the vulva to end in a conical process; vulva a little distance in front of the anus; uteri parallel; oviparous. Parasites of marsupials.

Type species: *L. labiostrongylus* n. sp.† ♂ 42 mm., ♀ 50–70 mm. In *Macropus* sp.

\* *Pharyngoststrongylus macropodis* n. sp. Length of male 11–12 mm., female 14–17 mm.; mouth capsule about 15  $\mu$  in depth and definitely broader than deep. Corona radiata arises from near the anterior end of the buccal capsule, and consists of about 16 delicate triangular finely pointed elements. Length of pharynx or vestibule about 200–230  $\mu$ , breadth about 30  $\mu$ . Cervical papillæ about 140  $\mu$  from the anterior extremity. Length of oesophagus about 2–2.3 mm. Spicules about 1.9–2 mm. in length. In the female the anus is about 400  $\mu$  from the tip of the tail and the vulva about 350  $\mu$  in front of the anus.

† *Labiostrongylus labiostrongylus* n. sp. Length of male about 42 mm., female 50–70 mm. Length of oesophagus in male about 9.4 mm., and in female about 11.3 mm. Spicules about 5.2 mm. in length. In the female the anus is about 2.2 mm. from the tip of the tail and the vulva is about 1.9 mm. in front of the anus.

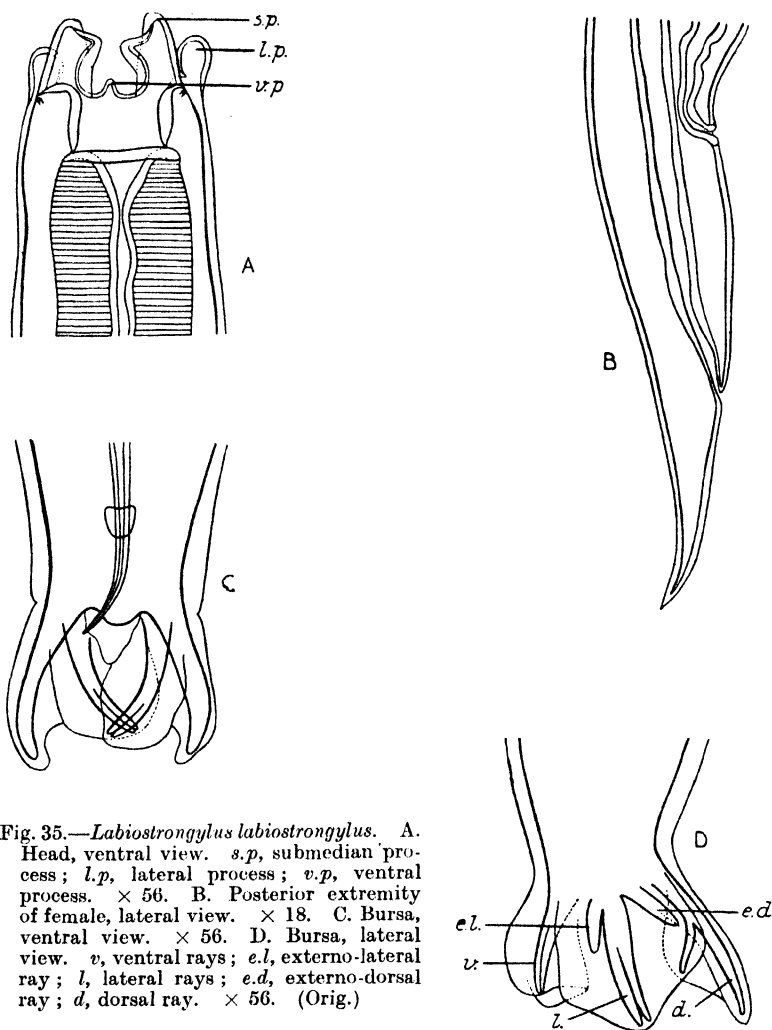


Fig. 35.—*Labiostrongylus labiostrongylus*. A. Head, ventral view. *s.p.*, submedian process; *l.p.*, lateral process; *v.p.*, ventral process.  $\times 56$ . B. Posterior extremity of female, lateral view.  $\times 18$ . C. Bursa, ventral view.  $\times 56$ . D. Bursa, lateral view. *v*, ventral rays; *e.l.*, externo-lateral ray; *l*, lateral rays; *e.d.*, externo-dorsal ray; *d*, dorsal ray.  $\times 56$ . (Orig.)

Genus **SPIROSTRONGYLUS** n. g.

*Definition*.—**TRICHONEMINÆ**: small worms, body spirally rolled permanently; mouth collar circular and shallow; buccal capsule almost cylindrical, slightly narrower posteriorly, with a leaf-crown consisting of ten broad elements arising from the base of the capsule and projecting forwards beyond the mouth collar. Cervical papillæ and excretory pore about the posterior end of the œsophagus; œsophagus markedly constricted at the level of the nerve ring about the commencement of the posterior fourth,

the anterior portion being slightly club-shaped posteriorly, and the posterior broad, short, and subglobular. Male : bursa well-developed, the lateral lobes being clearly marked off from the dorsal, and also from the small ventral lobes which are supported by the ventral rays ; with the following formula—ventral ray

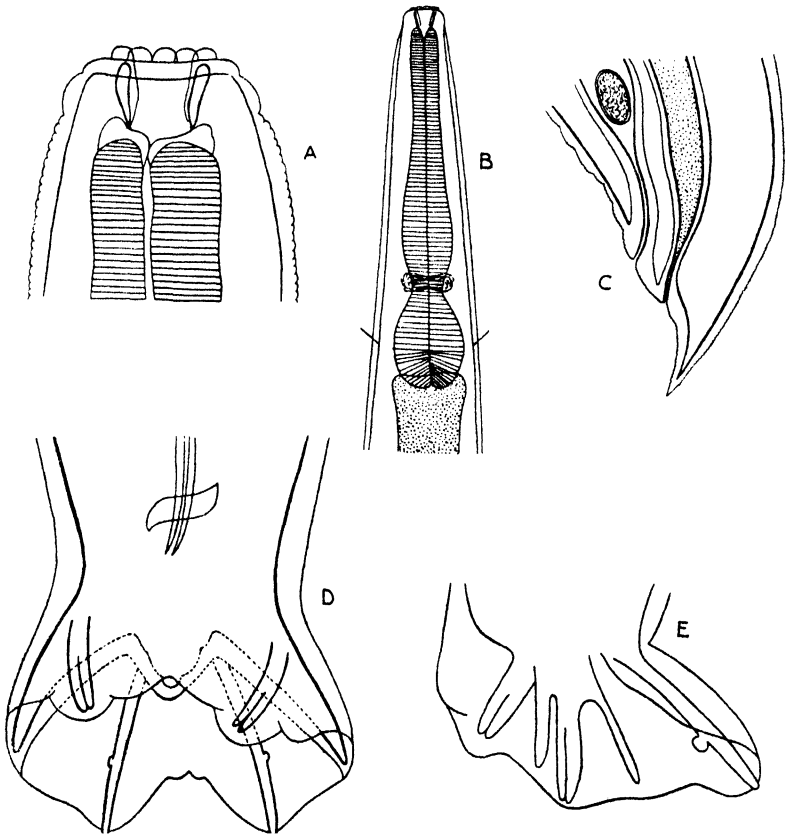


Fig. 36.—*Spirostrongylus spirostrongylus*. A. Head, ventral view.  $\times 330$ . B. Anterior extremity, ventral view.  $\times 75$ . C. Tail of female, lateral view.  $\times 330$ . D. Bursa, ventral view.  $\times 330$ . E. Bursa, lateral view.  $\times 220$ . (Orig.)

cleft, externo-lateral, lateral and externo-dorsal all arise from a common trunk, medio-lateral and postero-lateral fused except in the distal part, dorsal ray divided almost to its base, the limbs being widely separated, projecting beyond the margin of the bursa, and each giving off a short lateral branch ; spicules very long, thin, and striated, with simple points ; gubernaculum present.



Female : posterior extremity conical, vulva near anus. Oviparous. Parasites of marsupials.

Type species : \**S. spirostrongylus* n. sp. ♂ about 4 mm., ♀ about 5 mm. In *Macropus* sp.

Genus *KILULUMA* Skrjabin, 1916.

*Definition*.—*TRICHONEMINÆ* : mouth directed straight forwards and surrounded by a mouth collar subdivided into six sections,

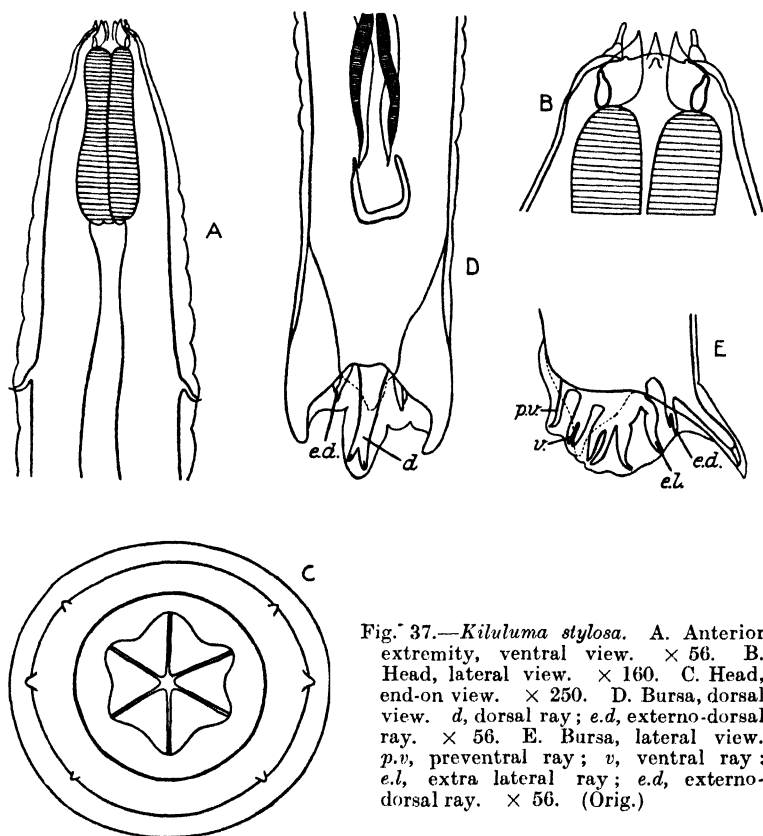


Fig. 37.—*Kiluluma stylosa*. A. Anterior extremity, ventral view.  $\times 56$ . B. Head, lateral view.  $\times 160$ . C. Head, end-on view.  $\times 250$ . D. Bursa, dorsal view. *d*, dorsal ray; *e.d.*, externo-dorsal ray.  $\times 56$ . E. Bursa, lateral view. *p.v.*, preventral ray; *v.*, ventral ray; *e.l.*, extra lateral ray; *e.d.*, externo-dorsal ray.  $\times 56$ . (Orig.)

2 lateral and 4 submedian, each bearing a head papilla; the lateral head papillæ are small and the submedian long and projecting, with club-like terminations; buccal capsule cylindrical and short, with stout walls; there is a single leaf-crown con-

\* *Spirostrongylus spirostrongylus* n. sp. Length of male about 4 mm., female about 5 mm. Mouth capsule about  $25\text{--}27\ \mu$  in depth and distinctly deeper than broad. The corona radiata consists of about ten broad elements arising from the base of the capsule. Œsophagus about  $650\ \mu$  in length, excretory pore and cervical papillæ about the posterior end of the Œsophagus. Spicules about 1.2 mm. in length. In the female the anus is about  $300$  to  $320\ \mu$  from the tip of the tail, and the vulva is about  $200\ \mu$  in front of the anus.

sisting of six elements arising from the base of the capsule, sweeping inwards and forwards, and projecting beyond the mouth collar when the mouth is open. Cuticle of the anterior part of the worm inflated; œsophagus short. Male: bursa short, lateral lobes clearly separated from the dorsal, which is longer; with the following formula—there is a well-developed pre-ventral ray, ventro-ventral and latero-ventral rays fused proximally, close together and parallel distally, externo-lateral and other laterals arise from a common trunk, medio-lateral and postero-lateral separate, there is an extra lateral ray \* between the postero-lateral and externo-dorsal, externo-dorsal arises from the base of the dorsal and is sometimes cleft distally, dorsal bifurcate in its distal portion; spicules equal, broad, winged, and twisted distally, with simple points; gubernaculum present. Female: posterior extremity narrows rapidly behind the anus to end in a conical tail; vulva near anus; vagina long; uteri parallel. Oviparous. Parasites of rhinoceroses.

Type species: *K. stylosa* (Linstow, 1907). ♂ 12–19 mm. ♀ 17–21 mm. In *Rhinoceros africanus*.

Syn., *Deletrocephalus stylosus* Linstow, 1907.

Other species:

*K. africana* Thapar, 1924. In *Rhinoceros africanus*.

*K. macdonaldi* Thapar, 1924. In *Rhinoceros africanus*.

*K. magna* Thapar, 1924. In *Rhinoceros africanus*.

*K. pachyderma* Thapar, 1924. In *Rhinoceros africanus*.

*K. rhinocerotis* Thapar, 1924. In *Rhinoceros africanus*.

*K. solitaria* Thapar, 1924. In *Rhinoceros africanus*.

With the exception of *K. magna*, these species appear to us to be very similar to one another. We have examined a large collection of worms belonging to the genus obtained from five rhinoceroses, and although the individual worms were found to exhibit considerable variation we have been unable to satisfy ourselves that more than one species was present. Thapar made a new subfamily *Kiluluminæ* for this genus, but this appears to us to be unnecessary.†

Refs. 371, 573, 613, 613b.

Genus *QUILONIA* Lane, 1914.

Syn., *Evansia* Railliet, Henry, and Joyeux, 1913, preoccupied.

*Nematevansia* Ihle, 1919.

*Definition*.—*TRICHONEMINÆ*: mouth directed straight forwards, surrounded by a mouth collar bearing 4 prominent submedian

\* It appears to us that this so-called extra lateral ray might well represent the externo-dorsal, and the so-called externo-dorsal be merely a branch of the dorsal ray.

† In a later paper Thapar (1925) has described four additional species of this genus from the African rhinoceros, viz., *K. goodeyi*, *K. brevicauda*, *K. brevivaginata*, and *K. cylindrica*.

head papillæ and a pair of lateral head papillæ; the leaf-crown is composed of a few characteristically curved elements arising posteriorly from the cuticle covering the anterior end of the œsophagus and continued anteriorly to surround the mouth. The cuticular lining of the oral cavity does not lie directly in contact with the mouth capsule, but is separated from it by

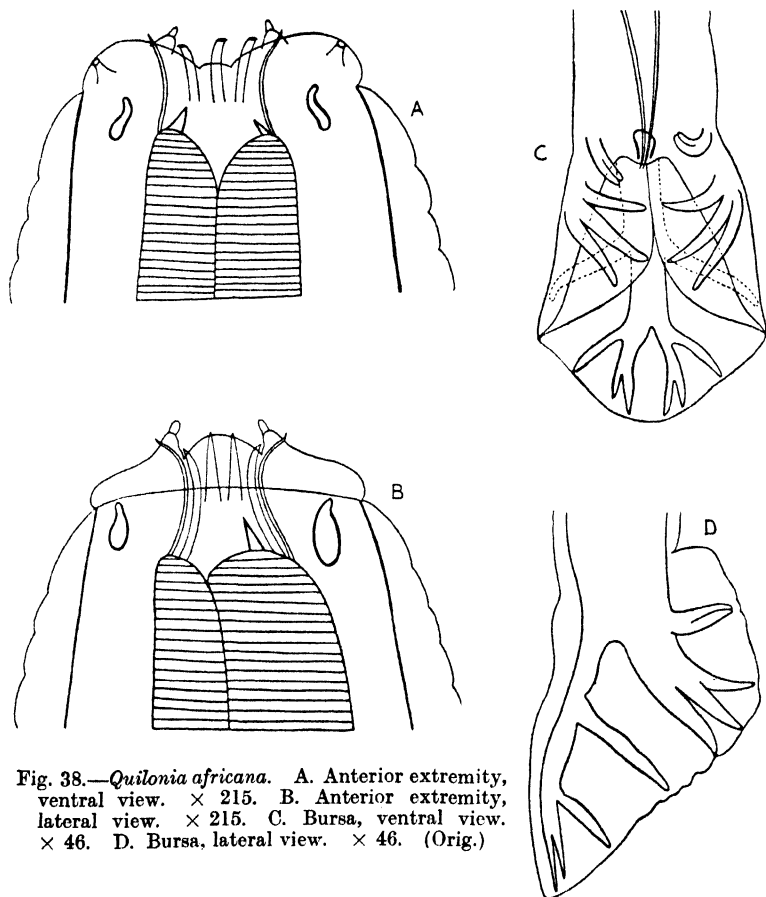


Fig. 38.—*Quilonia africana*. A. Anterior extremity, ventral view.  $\times 215$ . B. Anterior extremity, lateral view.  $\times 215$ . C. Bursa, ventral view.  $\times 46$ . D. Bursa, lateral view.  $\times 46$ . (Orig.)

parenchyma, so that the mouth cavity is narrower than the buccal capsule. Buccal capsule very short and ring-shaped; two or more teeth project into the oral cavity from the top of the œsophagus. Male: the dorsal lobe of the bursa is longer than the lateral lobes; bursal formula—ventral ray cleft, externo-lateral and laterals arise from a common trunk, medio-lateral and postero-lateral separated, externo-dorsal arises from a common trunk with the dorsal, dorsal bifurcate for about half its length, each

branch trifurcate. Female: posterior extremity straight, long, and pointed; vulva in the caudal third of the body. Parasites of elephants and rhinoceroses.

Type species: *Q. renniei* (Railliet, Henry, and Joyeux, 1913).

♂ 15 mm., ♀ 20 mm. In Indian elephant.

Syn., *Evansia renniei* Railliet, Henry, and Joyeux, 1913.

*Nematevansia renniei* (Railliet, Henry, and Joyeux, 1913).

*Q. quilona* Lane, 1914.

Other species:

*Q. africana* Lane, 1921. In African elephant.

*Q. apiensis* (Geddoelst, 1916). In African elephant.

*Q. brevicauda* Khalil, 1922. In African elephant.

*Q. ethiopica* Khalil, 1922. In African elephant.

*Q. parva* Neveu-Lemaire, 1925. In African rhinoceros.

*Q. rhinocerotis* Neveu-Lemaire, 1924. In rhinoceros.

*Q. travancra* Lane, 1914. In Indian elephant.

*Q. uganda* Khalil, 1922. In African elephant.

Refs. 221, 251, 255, 257, 264, 371, 372a, 450.

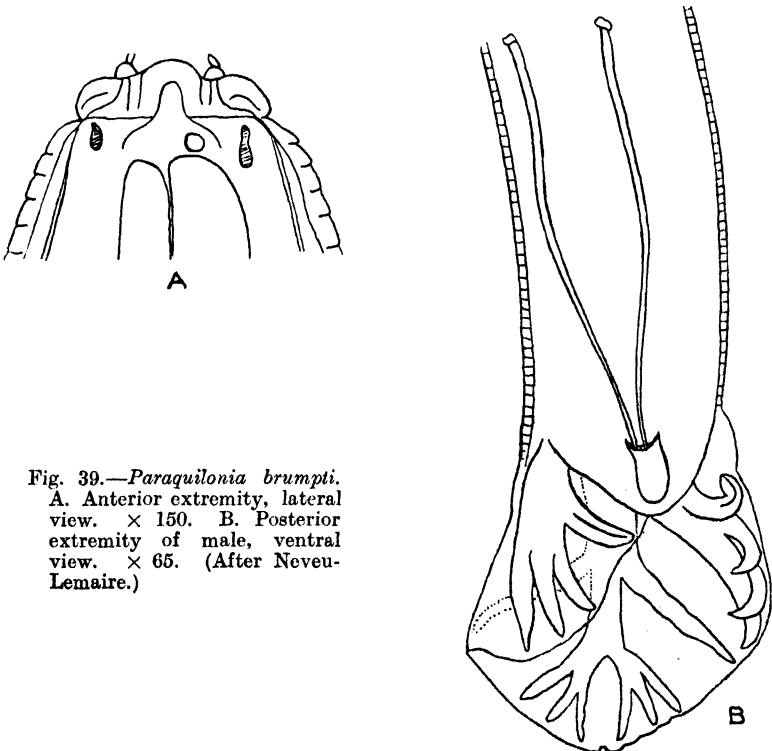


Fig. 39.—*Paraquilonia brumpti*.  
A. Anterior extremity, lateral view.  $\times 150$ . B. Posterior extremity of male, ventral view.  $\times 65$ . (After Neveu-Lemaire.)

Genus **PARAQUILONIA** Neveu Lemaire, 1924.

*Definition.*—**TRICHONEMINÆ**: mouth directed straight forwards, and surrounded by a mouth collar giving the appearance of six thick and rounded lips, two dorsal and two ventral, each bearing a prominent papilla the last portion of which is separated from the rest by a constriction, and two lateral lips without papillæ: the

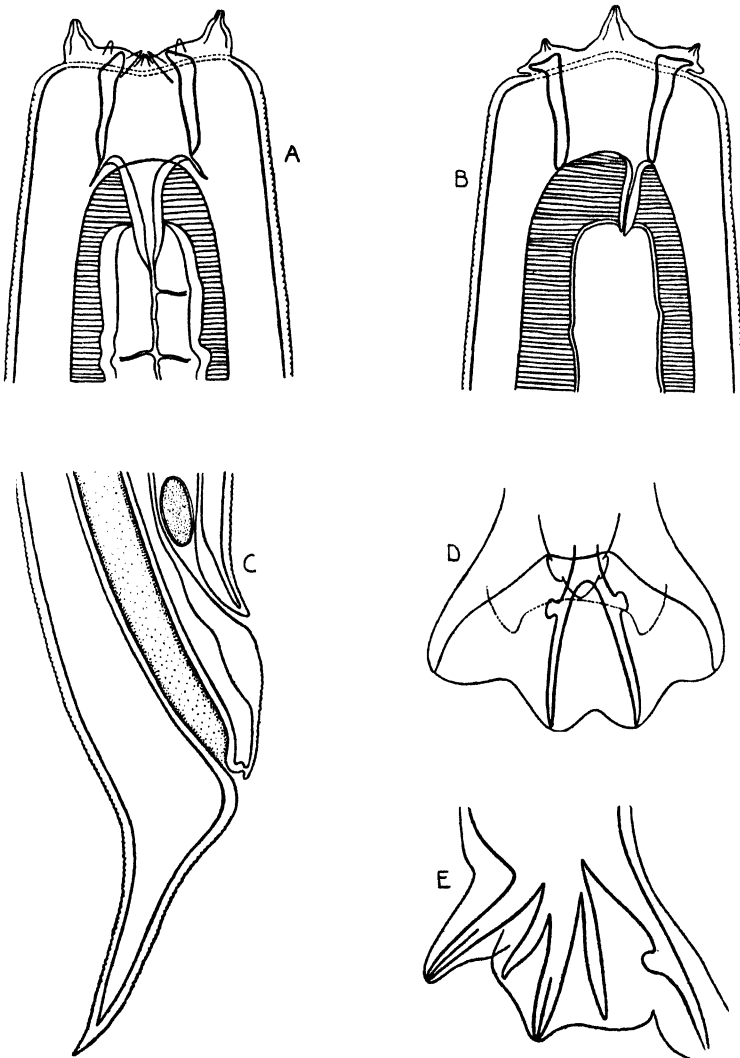


Fig. 40.—*Macropostrongylus macropostrongylus*. A. Anterior extremity, ventral view.  $\times 250$ . B. Anterior extremity, lateral view.  $\times 250$ . C. Tail of female, lateral view.  $\times 160$ . D. Bursa, dorsal view.  $\times 160$ . E. Bursa, lateral view.  $\times 160$ . (Orig.)

leaf-crown is rudimentary, buccal capsule short, ring-shaped and almost circular. Male: bursa with three well-developed lobes; with the following formula—ventral ray cleft, externo-lateral and laterals arising from a common trunk, externo-dorsal arising from a common trunk with the dorsal, dorsal bifurcate for about half its length, each branch being tridigitate; spicules equal, long, and thin; gubernaculum present. Female: vulva in the posterior fourth of the body; uteri opposed. Parasites of rhinoceroses.

Type species: *P. brumpti* Neveu-Lemaire, 1924. ♂ 14 mm., ♀ 22 mm. In *Rhinoceros bicornis*.

Ref. 371.

Genus **MACROPOSTRONGYLUS** n. g.

*Definition*.—**TRICHONEMINÆ**: mouth directed straight forwards, mouth collar with two large prominent lateral head papillæ, and four smaller submedian head papillæ; buccal capsule cylindrical with a leaf-crown arising from the internal surface of the capsule, and projecting beyond the mouth collar; œsophagus relatively long, and club-shaped posteriorly. Male: with a well-developed bursa completely closed ventrally by a ventral lobe, distinctly marked off from the lateral lobes, and supported by the ventral rays; with the following formula—ventral rays cleft in the distal portion, externo-lateral, lateral, and externo-dorsal rays arise from a common trunk, medio-lateral and postero-lateral fused in the proximal portion, dorsal divided nearly to the base, the limbs being widely separated and each giving off a short lateral branch; spicules long, delicate, striated, with simple points; gubernaculum present. Female: body tapers rapidly behind the anus to end in a sharply conical tail; vulva near anus; uteri parallel. Oviparous. Parasites of marsupials.

Type species: *\*M. macropoststrongylus* n. sp. ♂ 8–9 mm., ♀ 10–12 mm. In *Macropus* sp.

Other species: *†M. australis* n. sp. In *Macropus* sp.

*\* Macropoststrongylus macropoststrongylus* n. sp. Length of male 8–9 mm., female 10–12 mm.; buccal capsule about 40  $\mu$  in depth and definitely deeper than broad; leaf-crown composed of relatively small elements only slightly projecting beyond the mouth collar. Excretory pore about 850–875  $\mu$  from the anterior extremity. Length of œsophagus about 1.6 mm. in the male, and 1.75 mm. in the female. Spicules about 1.5 mm. in length; the lateral branch of the dorsal rays is given off shortly after the bifurcation. In the female the anus is about 250–275  $\mu$  from the tip of the tail, and the vulva is about 130–140  $\mu$  in front of the anus.

*† Macropoststrongylus australis* n. sp. Length of male 7–8 mm., female 8–9 mm.; buccal capsule about 12  $\mu$  in depth and definitely broader than deep; leaf-crown composed of relatively long elements projecting considerably beyond the mouth collar. Excretory pore about 510–560  $\mu$  from the anterior extremity. Length of œsophagus about 650  $\mu$  in the male, and 720  $\mu$  in the female. Spicules about 2.7 mm. in length; the lateral branch of the dorsal rays is given off about the commencement of the distal third of the main limbs. In the female the anus is about 160  $\mu$  from the tip of the tail, and the vulva is about 120  $\mu$  in front of the anus.

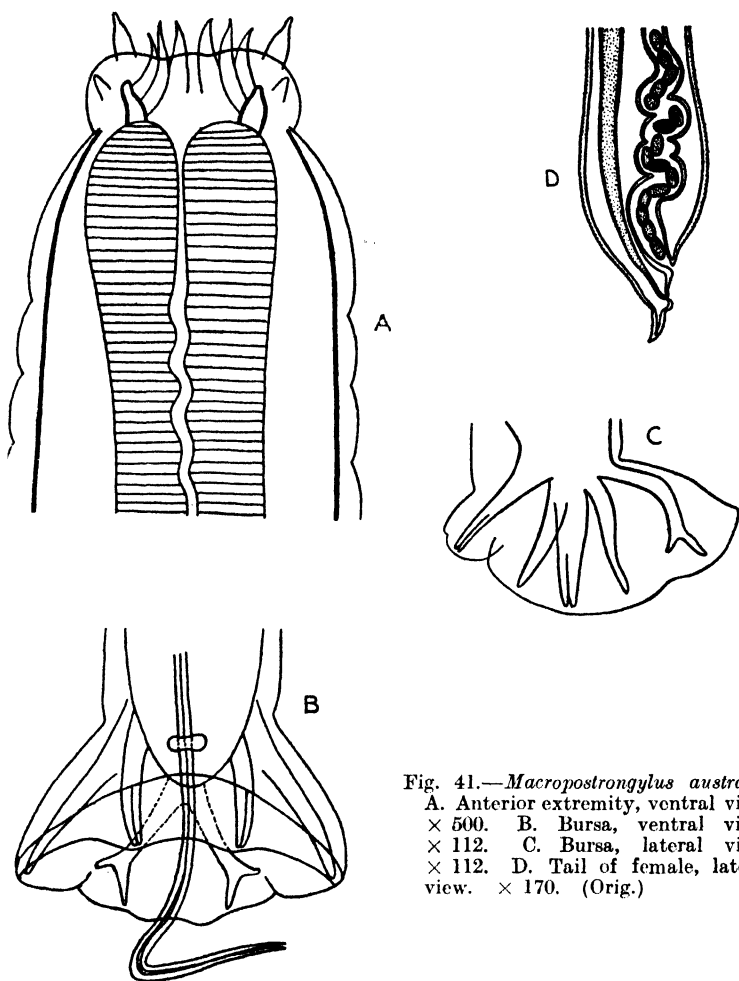


Fig. 41.—*Macropostrongylus australis*.  
 A. Anterior extremity, ventral view.  
 × 500. B. Bursa, ventral view.  
 × 112. C. Bursa, lateral view.  
 × 112. D. Tail of female, lateral  
 view. × 170. (Orig.)

**Genus THEILERIANA Monnig, 1924.**

**Definition.**—**TRICHONEMINÆ**: mouth directed straight forwards, slightly ellipsoidal with the long axis dorso-ventral, with a well-developed mouth collar. One leaf-crown arising from the base of the buccal capsule; buccal capsule very short, slightly ellipsoidal, long axis dorso-ventral, walls stout; duct of dorsal œsophageal gland projects into the buccal capsule as a tooth-like tubercle; œsophagus, very stout and short, and constricted at the level of nerve ring; cervical papillæ and excretory pore behind the posterior extremity of œsophagus. Male: bursa very large with two large lateral lobes and a smaller dorsal lobe; with the following formula—ventral rays cleft, externo-lateral and laterals arising from a

common trunk, medio-lateral cleft for the greater part of its length, postero-lateral lies close and parallel to it, externo-dorsal arising from a common trunk with the dorsal, dorsal bifurcate almost to its base, each limb dividing into two processes; spicules long and thin; gubernaculum present. Female: posterior extremity

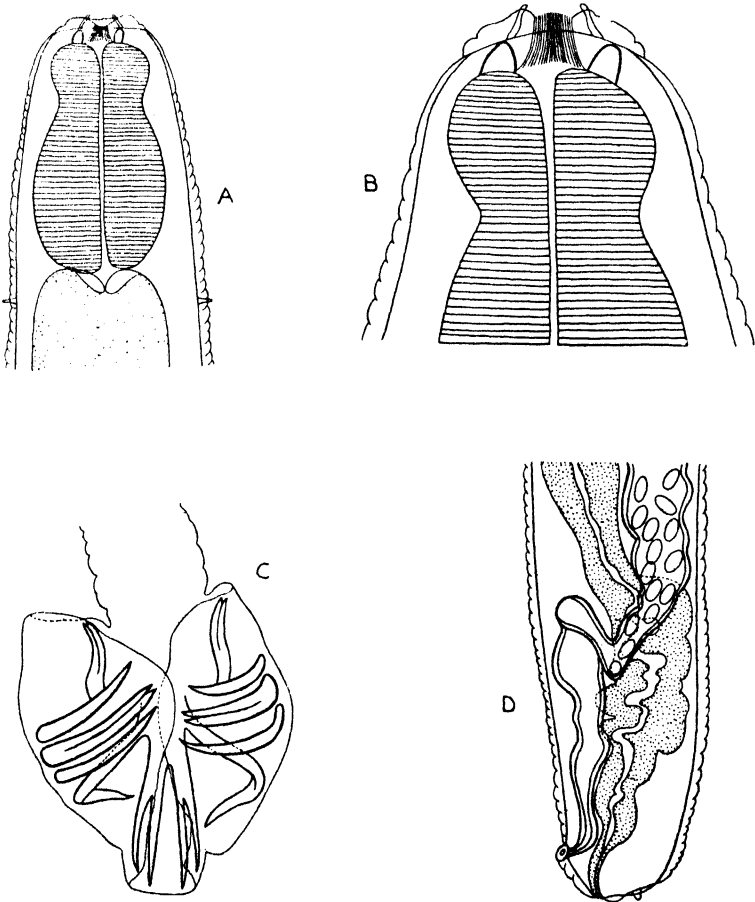


Fig. 42.—*Theileriana brachylaima*. A. Anterior extremity, ventral view.  $\times 64$ . B. Anterior extremity, lateral view.  $\times 180$ . C. Bursa, ventral view.  $\times 40$ . D. Tail of female, lateral view.  $\times 40$ . (Orig.)

rounded with a small conical terminal process; vulva near anus. Oviparous, eggs with thin shell and containing a well-developed embryo when deposited. Parasites of rodents.

Type species: *T. brachylaima* (Linstow, 1901).  $\sigma$  9–13 mm.,  $\text{♀}$  11–20 mm. In *Procavia* sp.

Syn., *Deletrocephalus brachylaimus* Linstow, 1901.



Other species : ? *T. variabilis* (Chapin, 1924). In *Testudo denticulata*.

Syn., *Deletrocephalus variabilis* Chapin, 1924.

Refs. 92, 320, 362, 652.

Genus **MURSHIDIA** Lane, 1914.

Syn., *Pteridopharynx* Lane, 1921.

*Memphisia* Khalil, 1922.

*Henryella* Neveu-Lemaire, 1924.

*Pterygopharynx* Witenberg, 1925.

*Definition*.—**TRICHONEMINÆ**: mouth directed straight forwards, mouth collar more prominent laterally giving the appearance of

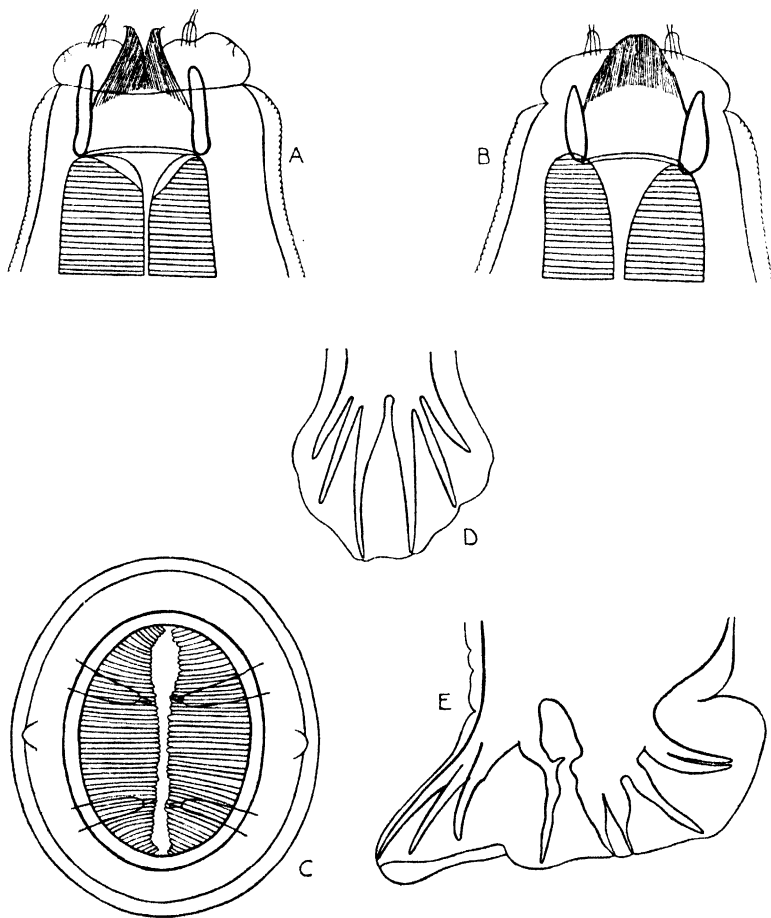


Fig. 43.—*Murshidia murshida*. A. Anterior extremity, ventral view (optical section).  $\times 160$ . B. Anterior extremity, lateral view.  $\times 160$ . C. Anterior extremity, end-on view.  $\times 260$ . D. Bursa, dorsal view.  $\times 56$ . E. Bursa, lateral view.  $\times 56$ . (Orig.)

two lateral lips, each of which bears a sessile lateral, and two prominent submedian, head papillæ; the leaf-crown arises from the internal surface of the buccal capsule, the point of origin being more anterior laterally than dorsally and ventrally; since the dorsal and ventral elements of the leaf-crown are much shorter than the lateral elements, their points, which form the boundary of the mouth, do not describe a circle, but produce a dorso-ventral slit, the mouth having a crescentic appearance when viewed laterally; the buccal capsule is roughly cylindrical and may or may not have in its depth a few teeth arising from the anterior end of the œsophagus; œsophagus short and stout, the cuticle lining the anterior portion may or may not exhibit a plumose sculpturing. Male: bursa with a well-developed dorsal lobe, and with the following formula—ventral, externo-lateral and lateral rays arising from a common trunk, the medio-lateral and postero-lateral separated in their distal portions, the externo-dorsal arises from the base of the dorsal, dorsal bifurcate for about half its length, and from about the point of bifurcation gives off either two lateral branches arising close together or a single lateral branch which is cleft to a greater or less extent, various small excrescences may be present on the postero-lateral or on the externo-dorsal ray; spicules equal, with the points bent in one direction; gubernaculum present. Female: posterior extremity long and tapering, vulva near anus. Parasites of elephants, rhinoceroses and warthogs.

Type species: *M. murshida* Lane, 1914. ♂ 18–20 mm., ♀ 22–28 mm. In Indian elephant.

Other species:

*M. africana* (Lane, 1921). In African elephant.

Syn., *Pteridopharynx africana* Lane, 1921.

*M. anisa* (Khalil, 1922). In African elephant.

Syn., *Pteridopharynx anisa* Khalil, 1922.

*M. aziza* (Khalil, 1922). In African elephant.

Syn., *Memphisia aziza* Khalil, 1922.

*M. bozasi* (Neveu-Lemaire, 1924). In African rhinoceros.

Syn., *Henryella bozasi* Neveu-Lemaire, 1924.

*M. didieri* (Neveu-Lemaire, 1924). In African rhinoceros.

Syn., *Henryella didieri* Neveu-Lemaire, 1924.

*M. falcifera* (Cobbold, 1882). In Indian elephant.

*M. hadia* Khalil, 1922. In African elephant.

*M. hamata* Daubney, 1923. In *Phacochoerus æthiopicus*.

*M. indica* (Ware, 1924). In Indian elephant.

*M. lanei* Witenberg, 1925. In elephant.

*M. linstowi* Khalil, 1922. In African elephant.

Syn., *Sclerostomum rectum* Linst., 1907, not *Strongylus rectus* Linst., 1906.

*M. memphisia* (Khalil, 1922). In African elephant.

Syn., *Memphisia memphisia* Khalil, 1922.

*M. neveu-lemairei* (Witenberg, 1925). In elephant.

*M. omænsis* (Neveu-Lemaire, 1924). In African rhinoceros.

Syn., *Pteridopharynx omænsis* Neveu-Lemaire, 1924.

*M. pugnicaudata* (Leiper, 1909). In *Phacochoerus æthiopicus*.

*M. raillieti* (Neveu-Lemaire, 1924). In African rhinoceros.

Syn., *Henryella raillieti* Neveu-Lemaire, 1924.

*M. rhinocerotis* (Neveu-Lemaire, 1924). In African rhinoceros.

Syn., *Memphisia rhinocerotis* Neveu-Lemaire, 1924.

*M. zeltneri* (Neveu-Lemaire, 1924). In African rhinoceros.

Syn., *Henryella zeltneri* Neveu-Lemaire, 1924.

Refs. 105, 118, 221, 251, 255, 257, 371, 448, 663, 666a.

Genus **BUISSONIA** Neveu-Lemaire, 1924.

*Definition*.—TRICHONEMINÆ: closely resembling *Murshidia* from which it apparently differs only in the absence of a definite

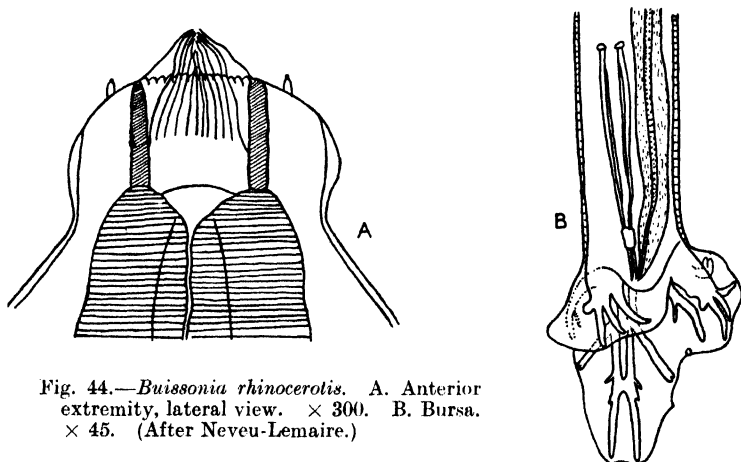


Fig. 44.—*Buissonia rhinocerotis*. A. Anterior extremity, lateral view.  $\times 300$ . B. Bursa.  $\times 45$ . (After Neveu-Lemaire.)

mouth collar, and in the absence or atrophy of the submedian head papillæ, with the result that the anterior margin of the capsule abuts directly on the end of the worm and the corona radiata, which consists of numerous converging elements, appears very prominent and projecting. Parasites of rhinoceroses.

Type species: *B. rhinocerotis* Neveu-Lemaire, 1924. ♂ 13 mm., ♀ 15 mm. In African rhinoceros,

Other species :

*B. africana* Neveu-Lemaire, 1924. In African rhinoceros.

*B. longibursa* Neveu-Lemaire, 1924. In African rhinoceros.  
Ref. 371.

Lane (1921) differentiated *Pteridopharynx* from *Murshidia* on the grounds that in the former the cuticle lining the anterior part of the œsophagus exhibited a plumose sculpturing, and that the two external branches of the dorsal ray were almost completely fused. Khalil (1922) emended *Pteridopharynx* by stating that the plumose sculpturing of the œsophagus may or may not be present, but that the genus is characterized by the presence of a prominence or accessory ray on the posterior border of the lateral ray, and that the two external branches of the dorsal ray are fused almost to their tips.\* Khalil then separated a number of worms closely resembling *Pteridopharynx* into a genus *Memphisia*, characterized by the presence of a cuticular collar round the anterior end of the body, and by the peculiarity of having a small branch on the externo-dorsal ray. The cuticular collar appears, however, to be a very variable character, and can hardly be seen in Khalil's figure of *Memphisia aziza*. Neveu-Lemaire (1924) expresses the opinion that the branch on the externo-dorsal ray is of only specific value, but adds another species to *Memphisia* on the ground of its having a cuticular collar. He then proceeds to erect a new genus *Henryella* closely resembling *Murshidia*, but differentiated from it by slight differences of the bursal formula. On comparing his drawing of the type species (*M. railletii*) with Lane's drawing of the type of *Pteridopharynx* (*P. africana*), we were, however, unable to discover the slightest difference. Finally, Neveu-Lemaire created a second genus *Buissonia* for worms closely resembling *Henryella*, but differing by the greater anterior projection of the leaf-crown, and by the absence, or atrophy, of the submedian head papillæ. On studying the figures of the three species included in this genus, the most striking feature appears to be the absence of the mouth collar, the buccal capsule reaching the anterior end of the worm.

After carefully considering the various points raised, and after working through the large collection of worms from elephants and rhinoceroses in the Liverpool School of Tropical Medicine, we have

\* In this connection, however, it must be noted that *Murshidia falcifera* (Cobbold, 1882) Lane, 1924, which Khalil includes in the genus *Murshidia*, exhibits a small prominence on the posterior border of the postero-lateral ray, and also one on the posterior border of the externo-dorsal ray, and furthermore that there is only a single branch of the dorsal ray, which is split for about half its length.

reached the conclusion that the genera *Pteridopharynx* Lane, 1914, *Memphisia* Khalil, 1922, and *Henryella* Neveu-Lemaire, 1924, are synonymous with *Murshidia* Lane, 1914. In view of the apparent absence of a mouth collar in *Buissonia*, we propose to leave this genus pending further investigation.

Genus **BOURGELATIA** Railliet, Henry, and Bauche, 1919.

*Definition*.—TRICHONEMINÆ: mouth circular directed straight forwards, two leaf-crowns; buccal capsule cylindrical with thick walls consisting of an anterior and a posterior portion. Male:

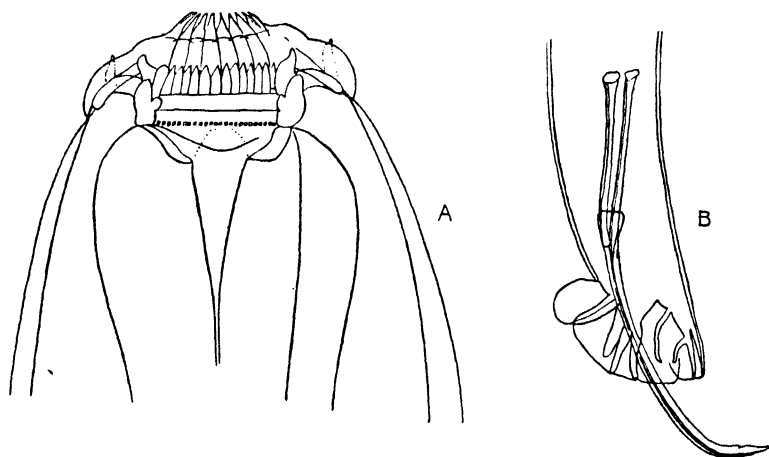


Fig. 45.—*Bourgelatia diducta*. A. Anterior extremity, dorsal view.  $\times 200$ . B. Bursa, lateral view.  $\times 50$ . (After Railliet, Henry, and Bauche.)

lateral lobes of bursa divided, giving the appearance of a five-lobed bursa; bursal formula—ventral ray cleft, externo-lateral and laterals arising from a common trunk, externo-dorsal arises from a common trunk with the dorsal, dorsal cleft for about half its length, each branch giving off one lateral branch; spicules equal, long, and winged; inconspicuous gubernaculum present. Female: vulva near anus; posterior extremity straight and ending in a sharp point. Parasites of pigs.

Type species: *B. diducta* Railliet, Henry, and Bauche, 1919. ♂ 9.3 mm., ♀ 11–13.5 mm. In pigs.

Ref. 449.

Genus **AMIRA** Lane, 1914.

Syn., *Khalilia* Neveu-Lemaire, 1924.

*Definition*.—TRICHONEMINÆ: mouth circular and directed straight forwards, with two leaf-crowns, the elements of the

external being long and thin, and all of equal size, and those of the internal being short and stout, and arising from the anterior orifice of the buccal capsule; buccal capsule very short and ring-shaped; œsophagus stout and hour-glass shaped, with a thick cuticular lining. Male: dorsal lobe of bursa may or may not be enormously elongated, prebursal papillæ much elongated; with the following formula—ventral ray cleft near its extremity only, externo-lateral and laterals arise from a common trunk and lie close together, externo-dorsal arises from a common trunk with

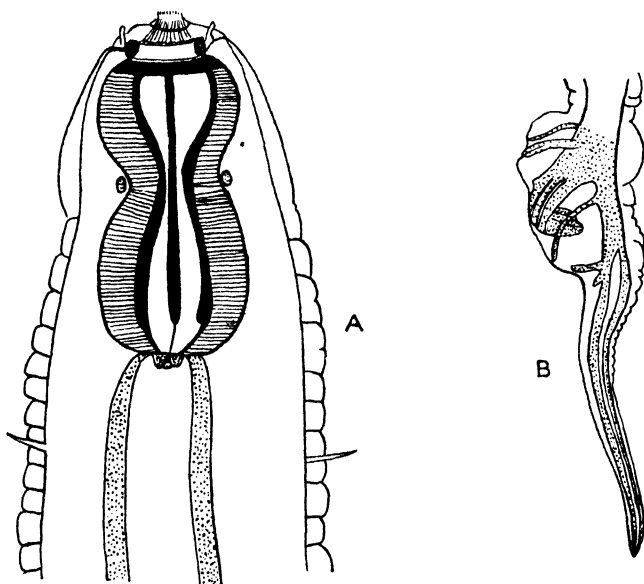


Fig. 46.—*Amira pileata*. A. Anterior extremity, dorso-ventral view.  $\times 60$ .  
B. Bursa, dorso-lateral view.  $\times 30$ . (After Khalil.)

the dorsal, dorsal bifurcate almost to its base, each branch giving off two lateral twigs close together; spicules of enormous length, equal and very thin; gubernaculum present. Female: posterior extremity tapering to a rather blunt point; vulva near anus; vagina very long; uteri parallel. Parasites of elephants and rhinoceroses.

Type species: *A. pileata* (Railliet, Henry, and Bauche, 1914).  
 $\sigma$  10 mm.,  $\phi$  13 mm. In Indian elephant.

Syn., *Cylicostomum pileatum* Railliet, Henry, and Bauche, 1914.

*Amira omra* Lane, 1914.

Other species :

*A. rhinocerotis* (Neveu-Lemaire, 1924). In rhinoceros.

Syn., *Khalilia rhinocerotis* Neveu-Lemaire, 1924.

*A. sameera* Khalil, 1922. In African elephant.

Refs. 251, 255, 257, 370, 371.

Neveu-Lemaire (1924) erected the genus *Khalilia* for *K. rhinocerotis*, and afterwards added to it *Amira sameera* Khalil, 1922. He differentiated the genus *Khalilia* from *Amira*, because, firstly the head in the former genus is slightly inclined dorsally, whereas in the latter it is directed straight forwards, and secondly, in the former the dorsal lobe of the bursa is short, whereas in the latter it is very long. These characters appear to us to be purely specific. Neveu-Lemaire includes the two genera in a new subfamily *Amirinæ* based on the bursal formula.

### TRICHONEMINÆ insufficiently known.

Genus *EUCYATHOSTOMUM* Molin, 1861.

*Definition*.—TRICHONEMINÆ : mouth circular, directed straight forwards, a single leaf-crown consisting of numerous slender

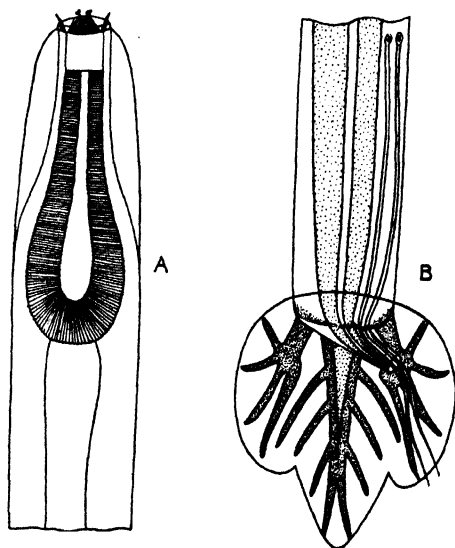


Fig. 47.—*Eucyathostomum longesubulatum*. A. Anterior extremity. B. Bursa.  
(After Molin.)

elements ; buccal capsule large, cylindrical, without teeth in its depth. Male : dorsal lobe of bursa projecting beyond the lateral lobes ; bursal formula—ventral, externo-lateral, and lateral rays

arise from a common trunk, ventral ray cleft at its extremity, externo-dorsal ray arises from a common trunk with the dorsal; dorsal gives off two lateral branches from each side of the common trunk, which is bifurcate in its distal third; spicules long, slender and equal. Female: vulva a short distance in front of the anus; posterior extremity narrows gradually behind the anus to end in a long conical tail. Parasites of ungulates.

Type species: *E. longesubulatum* Molin, 1861. ♂ 10–12 mm., ♀ 15–20 mm. In *Cervus campestris* and *Mazama rufa*.

Other species: ? *E. spinulosum* (Linstow, 1879). In *Capra ibex*.

Syn., *Strongylus spinulosus* Linstow, 1879.

Refs. 360, 420, 458.

#### Subfamily CESOPHAGOSTOMINÆ Railliet, 1915.

*Definition*.—STRONGYLIDÆ: with a transverse, ventral cervical groove and a more or less pronounced cephalic vesicle. Buccal capsule cylindrical, ring-shaped, or subglobular.

#### KEY TO GENERA.

1. Mouth capsule cylindrical and shallow or ring-shaped . . . . . *Cesophagostomum*, p. 85.
- Mouth capsule subglobular . . . . . 3
2. Mouth directed antero-dorsally.
- Esophageal funnel dilated and contains teeth . . . . . *Ternidens*, p. 88.
- Mouth directed antero-ventrally.
- Esophageal funnel does not contain teeth . . . . . *Chabertia*, p. 89

Genus **CESOPHAGOSTOMUM** Molin, 1861.

Syn., *Hypostomum* Stewart, 1898.

*Definition*.—CESOPHAGOSTOMINÆ: mouth directed straight forwards and surrounded by a mouth collar, which bears the head papillæ, and is sharply delimited behind by a deep annular constriction; shortly in front of the excretory pore is the ventral transverse groove extending round the body towards the dorsal surface; the cuticle between the mouth collar and the ventral groove is dilated to a greater or lesser extent forming the cephalic vesicle; usually there are two leaf-crowns, but occasionally the external is absent; buccal capsule shallow, cylindrical, or ring-



shaped. Lateral cuticular flanges sometimes present. Œsophageal funnel sometimes dilated and containing lancets. Male : bursal formula—ventral ray cleft, externo-lateral and laterals

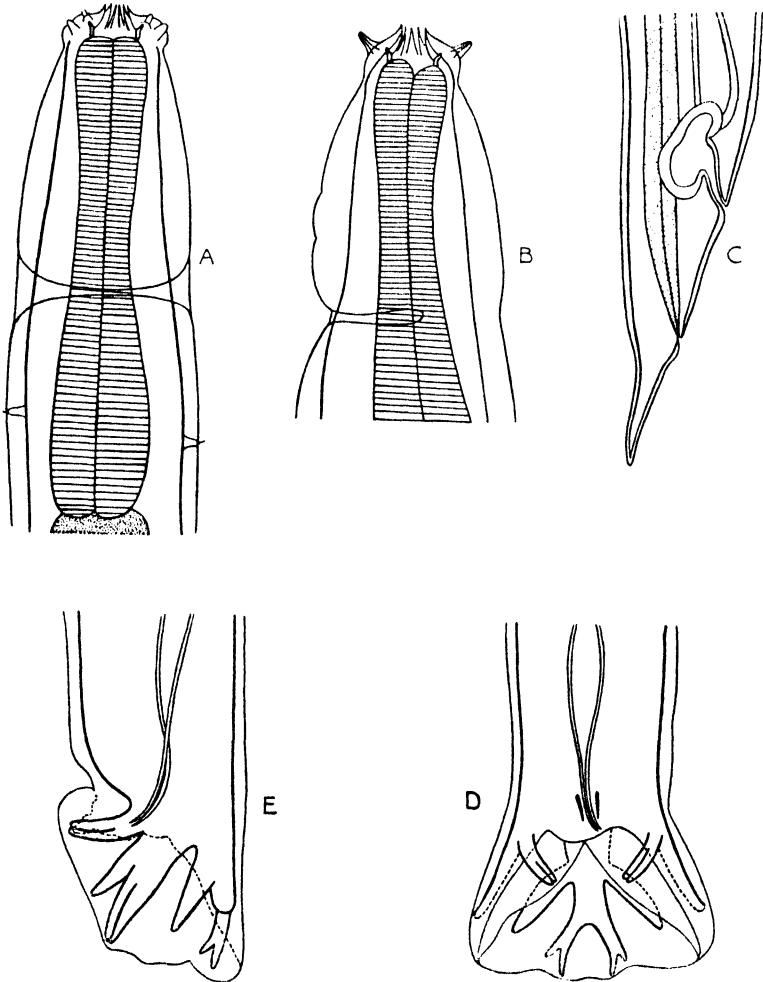


Fig. 48.—*Esophagostomum* (*Esophagostomum*) *dentatum*. A. Anterior extremity, ventral view.  $\times 160$ . B. Anterior extremity, lateral view.  $\times 160$ . C. Tail of female, lateral view.  $\times 56$ . D. Bursa, ventral view.  $\times 84$ . E. Bursa, lateral view.  $\times 84$ . (Orig.)

arise from a common trunk, medio-lateral and postero-lateral fused proximally, externo-dorsal arising from a common trunk with the dorsal, dorsal bifurcate for about half its length, each branch giving off a short lateral twig; spicules equal; guber-

naeculum present. Female : vulva a little distance from the anus. Parasites of mammals.

Type species : *O. dentatum* (Rudolphi, 1803). ♂ 8–12 mm., ♀ 12–15 mm. In the domesticated pig.

Syn., *O. subulatum* Molin, 1861.

Other species :

*O. aculeatum* (Linstow, 1879). In *Macacus* sp.

*O. apiostomum* (Willach, 1891). In man and monkeys.

*O. asperum* Railliet and Henry, 1913. In goats.

*O. attenuatum* (Leidy, 1856). In *Cynocephalus porcarius*.

*O. bifurcum* (Creplin, 1849). In *Cercopithecus patas*.

*O. blanchardi* Railliet and Henry, 1912. In orang outan.

*O. brumpti* Railliet and Henry, 1905. In man.

*O. columbianum* Curtice, 1890. In goat and sheep.

Syn., *Hypostomum columbiana* (Curtice, 1890) Stewart, 1898.

*O. dentigerum* Railliet and Henry, 1906. In chimpanzee.

*O. eurycephalum* Goodey, 1924. In roan antelope.

*O. mwanzæ* Daubney, 1924. In warthog and roan antelope.

*O. oldi* Goodey, 1924. In roan antelope and warthog.

*O. ovatum* (Linstow, 1906). In *Hylobates* spp.

*O. pachycephalum* Molin, 1861. In *Cercopithecus* sp.

*O. radiatum* (Rudolphi, 1803). In cattle.

Syn., *O. inflatum* (Schneider, 1866).

*O. dilatatum* (Railliet, 1884).

*O. bovis* Schnyder, 1906.

*O. biramosum* Cuillé, Marotel, and Panisset, 1911.

*O. vesiculosum* Rätz, 1898.

*O. simpsoni* Goodey, 1924. In warthog and roan antelope.

*O. stephanostomum* Stoss., 1904. In gorilla.

*O. stephanostomum* var. *thomasi* Railliet and Henry, 1909. In man.

*O. ventri* Thornton, 1924. In Brazilian wild cat.

*O. venulosum* (Rud., 1809). In goat and sheep.

*O. xeri* Ortlepp, 1922. In *Xerus setosus*.

*O. yorkei* Thornton, 1924. In *Phacocercus æthiopicus*.

Railliet and Henry (1913) and Ihle (1922) have divided the genus into the following subgenera :—

**Subgenus ŒSOPHAGOSTOMUM** (Molin, 1861) Railliet and Henry, 1913.

**Definition.**—Cephalic vesicle well-developed, cervical papillæ at the level of the posterior œsophageal swelling, cuticular flanges absent, vagina short, almost transverse. Contains the species *dentatum*.

**Subgenus HYSTERACRUM** Railliet and Henry, 1918.

*Definition*.—Cephalic vesicle well-developed, cervical papillæ behind the œsophagus, cuticular lateral flanges absent or very narrow; vagina long, directed forwards. Contains the species *venulosum* and *asperum*.

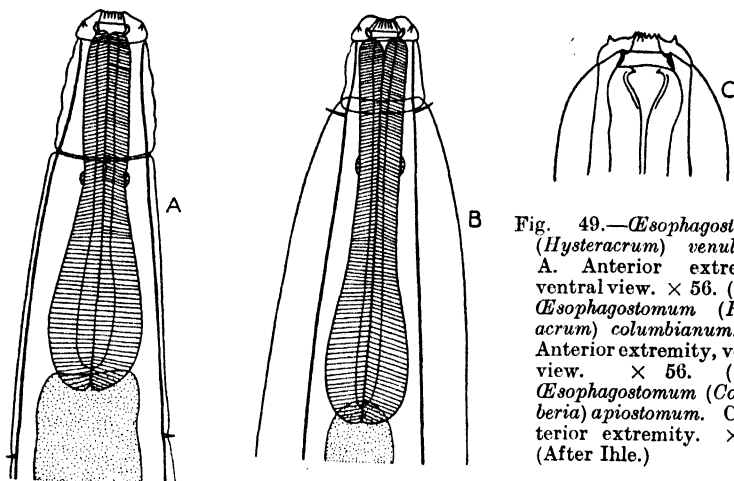


Fig. 49.—*Æsophagostomum* (*Hysteracrum*) *venulosum*. A. Anterior extremity, ventral view.  $\times 56$ . (Orig.) *Æsophagostomum* (*Proteracrum*) *columbianum*. B. Anterior extremity, ventral view.  $\times 56$ . (Orig.) *Æsophagostomum* (*Conowebertia*) *apistomum*. C. Anterior extremity.  $\times 115$ . (After Ihle.)

**Subgenus PROTERACRUM** Railliet and Henry, 1918.

*Definition*.—Cephalic vesicle small or absent, cervical papillæ in front of the œsophageal swelling, lateral cuticular flanges present; vagina short, almost transverse. Contains the species *columbianum* and *radiatum*.

**Subgenus CONOWEBERIA** Ihle, 1922.

*Definition*.—Cephalic vesicle well-developed, cervical papillæ close behind middle of œsophagus, cuticular lateral flanges absent; the small buccal capsule has the shape of a truncated cone; œsophageal funnel with three teeth behind the mouth capsule; vagina long and directed forwards. Contains the species *apistomum* and *brumpti*.

Goodey (1924), who has studied the genus in great detail, reaches the conclusion that its division into the above subgenera is unnecessary and undesirable; and Thornton (1924) is of the same opinion.

Refs. 121, 134, 189, 191, 192, 233, 283, 360, 377, 403, 416, 427, 435, 440, 449, 458, 605, 619, 654.

**Genus TERNIDENS** Railliet and Henry, 1909.

*Definition*.—**ÆSOPHAGOSTOMINÆ**: mouth directed slightly dorsally, two leaf-crowns; buccal capsule subglobular. **Æsophageal** funnel dilated and containing three teeth, each consisting of two lamellæ, projecting into the depth of the capsule. Transverse ventral cervical groove present, cephalic vesicle very slight.

Male: bursal formula as in *Æsophagostomum*; spicules equal.  
 Female: vulva near anus. Parasites of primates.

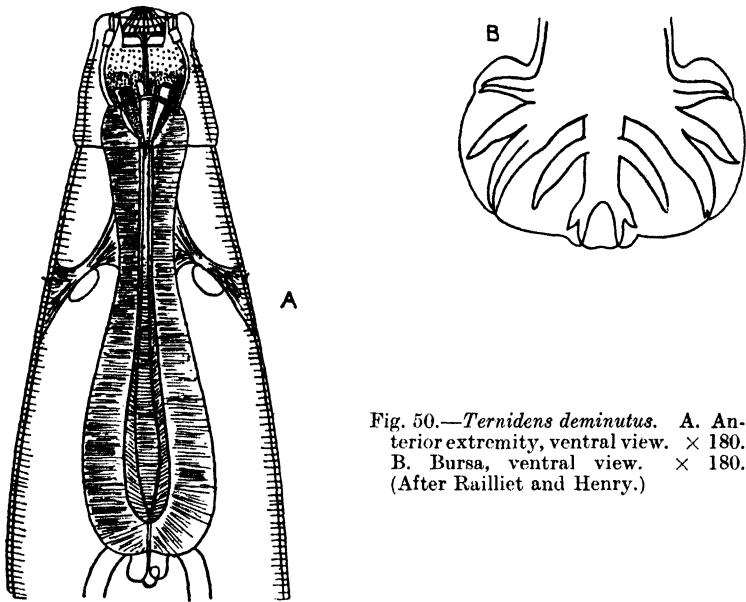


Fig. 50.—*Ternidens deminutus*. A. Anterior extremity, ventral view.  $\times 180$ .  
 B. Bursa, ventral view.  $\times 180$ .  
 (After Railliet and Henry.)

Type species: *T. deminutus* (Railliet and Henry, 1905).  
 $\sigma$  9.5 mm.,  $\phi$  11.7 mm. In man and monkeys.

Syn., *Triodontophorus deminutus* Railliet and Henry, 1905.

? *Globocephalus macaci* Smith, Fox, and White, 1908.

Refs. 284, 415, 420, 435, 583.

Genus **CHABERTIA** Railliet and Henry, 1909.

*Definition*.—**ÆSOPHAGOSTOMINÆ**: mouth directed antero-ventrally, two very small leaf-crowns; buccal capsule sub-globular without teeth in its depth. Æsophageal funnel does not contain teeth. Transverse ventral cervical groove present, cephalic vesicle slight. Male: bursal formula as in *Æsophagostomum*; spicules equal; gubernaculum present. Female: vulva near anus. Parasites of ungulates.

Type species: *C. ovina* (Fabricius, 1788 or 1794).  $\sigma$  13–14 mm.,  $\phi$  17–20 mm. In goats, sheep, cattle and deer.

Syn., *Strongylus ovinus* Fabricius, 1788 or 1794.

*Strongylus ovinus* Gmelin, 1790.

*Strongylus hypostomus* Rud., 1819.

Refs. 420, 458.

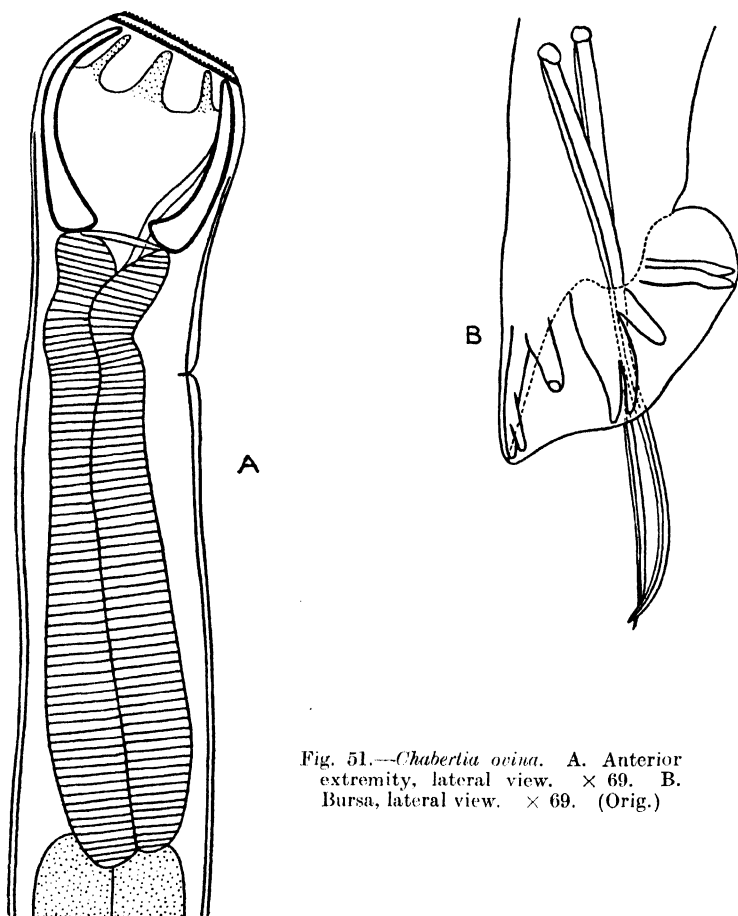


Fig. 51.—*Chabertia ovina*. A. Anterior extremity, lateral view.  $\times 69$ . B. Bursa, lateral view.  $\times 69$ . (Orig.)

FAMILY ANCYLOSTOMIDÆ (LOOSS, 1905) LANE, 1917.

Syn., *Agchylostomidæ* Looss, 1905.

*Definition*.—STRONGYLOIDEA : with a well-developed chitinous buccal capsule, the oral aperture of which is guarded by ventral cutting organs. Parasites of the alimentary canal.

KEY TO SUBFAMILIES.

1. Ventral cutting organs plate-like      Necatorinæ, p. 96.
- Ventral cutting organs tooth-like      2
2. Mouth directed obliquely dorsally, ventral teeth directed into mouth cavity.      Ancylostominæ, p. 91.

Mouth directed obliquely ventrally, ventral teeth directed outwards . . . . Strongylacanthinæ, p. 95.

Subfamily ANCYLOSTOMINÆ (Looss, 1905) Stephens, 1916.

Syn., *Agchylostominæ* Looss, 1905.

*Ankylostominæ* Railliet and Henry, 1909.

*Definition.*—ANCYLOSTOMIDÆ: mouth directed obliquely dorsally, the oral margin of the buccal capsule is provided ventrally with teeth directed inwardly.

# KEY TO GENERA.

1. Buccal capsule shallow, anterior end of œsophagus enormously dilated . . . . Agriostomum, p. 95.  
Buccal capsule subglobular, anterior end of œsophagus not enormously dilated. . . . . 2
2. Buccal capsule completely chitinized, dorsal notch on oral margin . . . . Ancylostoma, p. 91.  
Buccal capsule chitinized only in latero-ventral regions, no dorsal notch on oral margin . . . . . Galoncus, p. 94.

Genus ANCYLOSTOMA \* (Dubini, 1843) Creplin, 1845.

Syn., *Agchylostoma* Dubini, 1843.

*Anchylostomum* Diesing, 1851.

*Ankylostoma* Lutz, 1885.

*Diploodon* Molin, 1861.

*Definition.*—ANCYLOSTOMINÆ: anterior extremity bent dorsally; buccal capsule infundibular, one to three pairs of ventral teeth at the oral margin, and two triangular lancets in the depth of the capsule. Duct of the dorsal œsophageal gland runs in a ridge on the dorsal wall of the capsule, and opens at the bottom of a deep notch on its oral margin. Male: bursal formula—ventral ray cleft, externo-lateral and laterals arise from a common trunk, medio-lateral and postero-lateral separate, externo-dorsal arising from a common trunk with the dorsal, dorsal bifurcate, each branch being tridigitate; spicules equal; gubernaculum

\* Lane, 1916, divided the genus *Ancylostoma* into two subgenera, viz., the subgenus *Ancylostoma* with *A. (Ancylostoma) duodenale* as the type, and the subgenus *Ceylancylostoma* with *A. (Ceylancylostoma) ceylanicum* as the type.

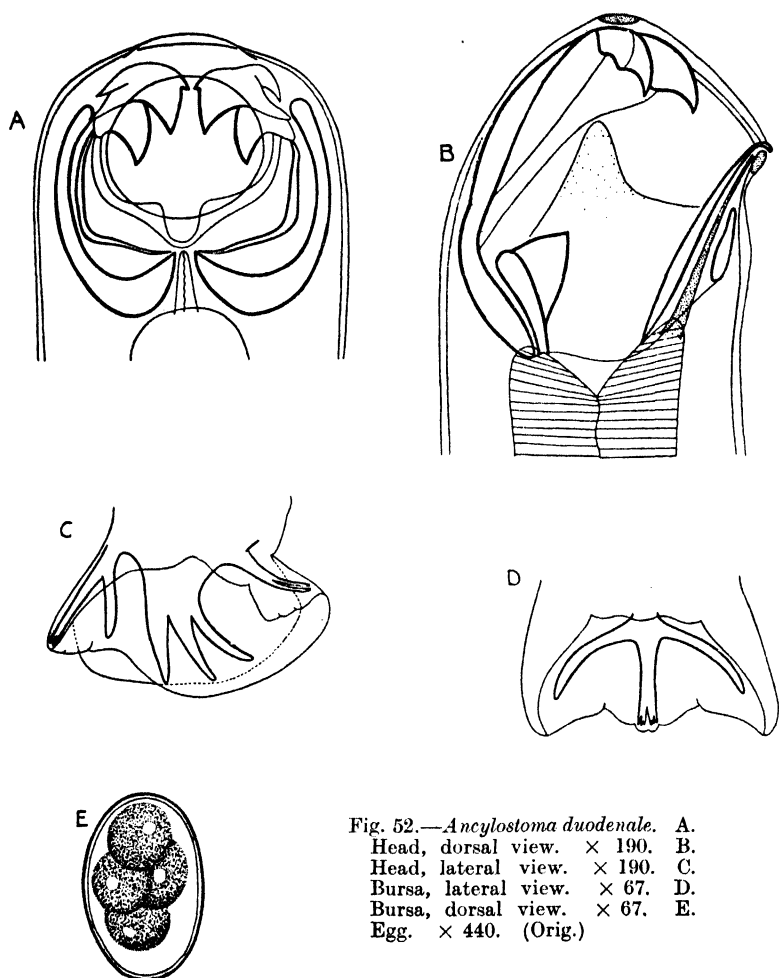


Fig. 52.—*Ancylostoma duodenale*. A. Head, dorsal view.  $\times 190$ . B. Head, lateral view.  $\times 190$ . C. Bursa, lateral view.  $\times 67$ . D. Bursa, dorsal view.  $\times 67$ . E. Egg.  $\times 440$ . (Orig.)

present. Female: vulva in posterior third of body. Parasites of the intestine of mammals.

Type species: *A. duodenale* (Dubini, 1843) Creplin, 1845. ♂ 9 mm., ♀ 12 mm. In man, *Felis* spp. and the pig.

Syn., *Agchylostoma duodenale* Dubini, 1843.

*Strongylus quadridentatus* Sieb., 1851.

Other species:

*A. braziliense* de Faria, 1910. In man, dog, cat, tiger, lion, leopard, wolf, and sloth bear.

Syn., *A. ceylanicum* (Looss, 1911).

*A. caninum* (Ercolani, 1859). In dog, jackal, wolf, fox, tiger, and sloth bear.

*A. coneptati* (Solonet, 1911). In *Conepatus suffocans*.

*A. gilsoni* Gedoelst, 1917. In *Sciurus prevosti*.

*A. malayanum* (Alessandrini, 1905). In man and bear.

*A. minimum* (Linstow, 1906). In *Felis rubiginosa*.

*A. mucronatum* (Molin, 1861). In *Dasypus gilvipes*.

Syn., *Diploodon mucronatum* Molin, 1861.

*A. mycetis* nom. nov. In *Mycetes coraya*.

Syn., *Diploodon quadridentatum* Molin, 1861 [homonym].

*A. pluridentatum* (Alessandrini, 1905). In *Felis mitis*.

Refs. 115, 128, 130, 152, 197, 254, 259, 261, 263, 266, 293, 294, 328, 341, 344, 360, 669, 670.

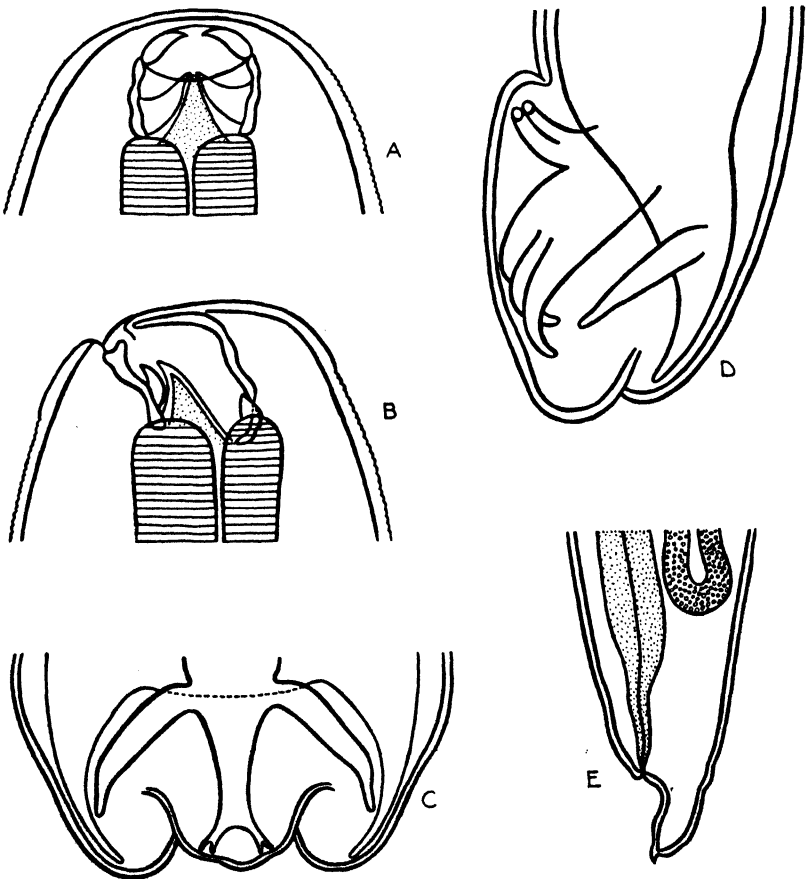


Fig. 53.—*Galoncus perniciosus*. A. Anterior extremity, dorsal view.  $\times 215$ . B. Anterior extremity, lateral view.  $\times 215$ . C. Bursa, dorsal view.  $\times 215$ . D. Bursa, lateral view.  $\times 215$ . E. Posterior extremity of female, lateral view.  $\times 90$ . (Orig.)



Genus *GALONCUS* Railliet, 1918.

*Definition*.—*ANCYLOSTOMINÆ*: anterior extremity bent dorsally; buccal capsule small in size as compared with the width of the head, and actually chitinized only in the latero-ventral regions; one or more pairs of ventral teeth at its entrance; in the depth of the capsule on the ventral wall are a pair of small triangular lancets, and on the dorsal wall are two long conical teeth, one on each side of the cone of the duct of the dorsal œsophageal gland. Male: bursal formula as in *Ancylostoma*; spicules equal; gubernaculum present. Female: vulva in the posterior fourth of the body. Parasites in submucous cysts in gut of *Felidæ*.

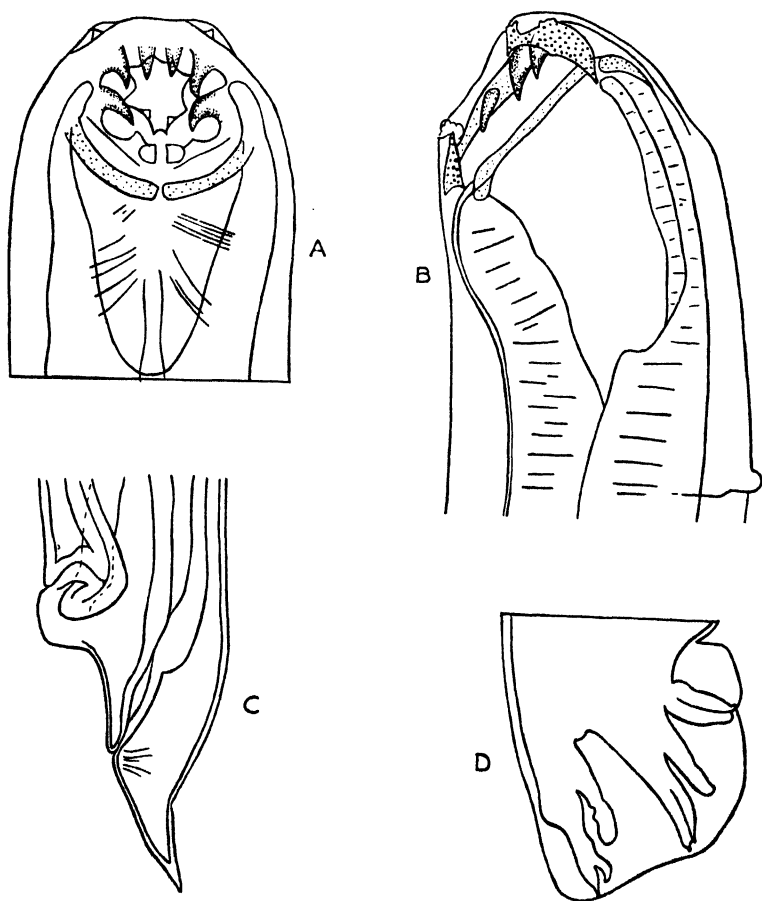


Fig. 54.—*Agriostomum vryburgi*. A. Anterior extremity, dorsal view.  $\times 165$ . B. Anterior extremity, lateral view.  $\times 165$ . C. Tail of female.  $\times 37$ . D. Bursa, lateral view.  $\times 120$ . (After Lane.)

Type species : *G. perniciosus* (Linstow, 1885). ♂ 8–14 mm. ♀ 17–18 mm. In submucous cysts in gut of *Felidæ*.

Syn., *Ankylostomum perniciosum* Linstow, 1885.

Other species : *G. tridentatus* Khalil, 1922. In a leopard.

Refs. 248, 314, 408.

**Genus AGRIOSTOMUM\* Railliet, 1902.**

*Definition.*—ANCYLOSTOMINÆ : anterior extremity bent dorsally ; buccal capsule cylindrical and shallow, the oral margin surrounded by four pairs of teeth [or according to Lane (1923), by only three pairs]. Anterior extremity of the œsophagus enormously dilated into a large funnel. Well-marked cervical ventral groove present. Male : bursal formula—ventral ray cleft, externo-lateral and laterals arising from a common trunk, medio-lateral and postero lateral close together, externo-dorsal arising from a common trunk with the dorsal, dorsal bifurcate, each branch bidigitate ; spicules equal ; gubernaculum present. Female : vulva near anus. Parasites of ruminants.

Type species : *A. vryburgi* Railliet, 1902. ♂ 9 mm., ♀ 14.5–15.5 mm. In *Bos zebu*.

Refs. 268, 402, 440.

**Subfamily STRONGYLACANTHINÆ n.sf.**

*Definition.*—ANCYLOSTOMIDÆ : mouth directed obliquely ventrally, with a subglobular buccal capsule, the oral margin of which is provided ventrally with teeth directed outwards.

**Genus STRONGYLACANTHA Beneden, 1873.**

*Definition.*—STRONGYLACANTHINÆ : mouth directed obliquely ventrally, oval with long axis dorso-ventral ; from the ventral margin of the mouth arise two strongly-curved teeth directed outwards and backwards ; the buccal cavity has thick chitinous walls, is funnel-shaped, and is provided in its depth on the dorsal wall with a lancet-shaped tooth directed forwards. The œsophagus is cylindrical and dilated posteriorly ; the excretory pore is very far forward, just behind the mouth. Male : bursal formula—ventral ray cleft, externo-lateral and laterals arise from a common trunk, medio-lateral and postero-lateral separated, externo-dorsal arises separately from the dorsal, dorsal usually undivided, and ending in six small branches, but may show various modifications ; spicules fairly thick and equal, each bifurcated for its distal half.

\* Lane (1923) suggests a new subfamily *Agriostominæ* for this genus.

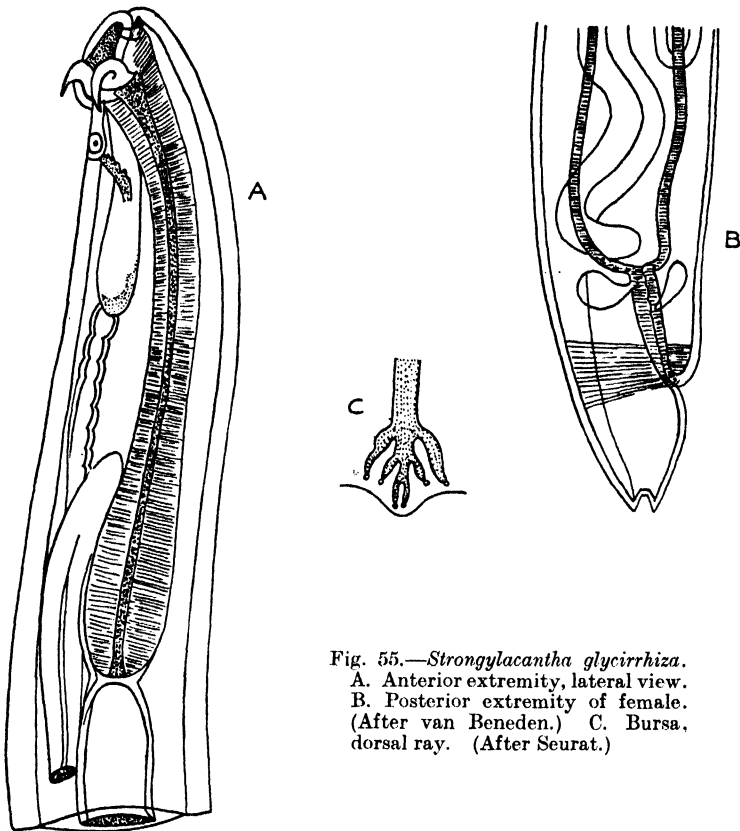


Fig. 55.—*Strongylacantha glycirrhiza*.  
 A. Anterior extremity, lateral view.  
 B. Posterior extremity of female.  
 (After van Beneden.) C. Bursa,  
 dorsal ray. (After Seurat.)

Female: posterior extremity narrows rapidly behind the anus and ends in two sharp points; vulva in the posterior third of the body. Parasites of bats.

Type species: *S. glycirrhiza* Beneden, 1873. ♂ 2–3 mm., ♀ a little longer. In bats.

Refs. 51, 558, 563.

#### Subfamily NECATORINÆ Lane, 1917.

Syn., *Bunostominæ*\* Looss, 1911.

**Definition.**—ANCYLOSTOMIDÆ: mouth directed antero-dorsally; with a subglobular buccal capsule the oral margin of which is provided ventrally with semilunar plates.

\* Owing to the difference of opinion which exists regarding the status of the genus *Bunostomum*, we adhere to the subfamily name *Necatorinæ*.

## KEY TO GENERA.

- |   |   |                         |
|---|---|-------------------------|
| Bursa symmetrical . . . . .   | 1 |                         |
| Bursa asymmetrical . . . . .  | 8 |                         |
| 1. Intestinal diverticulum present . . . . .  |   | Grammocephalus, p. 102. |
| Intestinal diverticulum absent . . . . .  | 2 |                         |
| 2. Buccal capsule fissured, internal surface raised into a series of ridges . . . . .   |   | Bathmostomum, p. 104.   |
| Buccal capsule not fissured . . . . .   | 3 |                         |
| 3. Buccal capsule composed of a number of chitinous parts articulating with each other; without lancets in depth of capsule . . . . . |   | Arthrocephalus, p. 107. |
| Buccal capsule continuous; with lancets in depth of capsule . . . . .   | 4 |                         |
| 4. With two pairs of lancets in depth of buccal capsule . . . . .   | 5 |                         |
| With one pair of lancets in depth of buccal capsule . . . . .   | 7 |                         |
| 5. Subdorsal and subventral lancets bi- or tri-cuspid . . . . .   |   | Tetragomphius, p. 105.  |
| Subdorsal and subventral lancets simple . . . . .   | 6 |                         |
| 6. Dorsal ray of bursa doubled . . . . .  |   | Necator, p. 97.         |
| Dorsal ray of bursa forked only at its extremity . . . . .  |   | Brachyclonus, p. 99.    |
| 7. Dorsal lobe of bursa larger than lateral . . . . .   |   | Gaigeria, p. 101.       |
| Dorsal lobe of bursa much smaller than lateral . . . . .  |   | Uncinaria, p. 101.      |
| 8. Both lateral and dorsal lobes of bursa asymmetrical; mouth capsule without lancets in depth . . . . .                              |   | Monodontella, p. 109.   |
| Lateral lobes of bursa symmetrical, dorsal lobe asymmetrical; mouth capsule with lancets in depth . . . . .                           |   | Bunostomum, p. 107.     |

## Genus NECATOR Stiles, 1903.

Syn., ? *Eumonodontus* Railliet and Henry, 1910.? *Monodontus* Molin, 1861, in part.

*Definition.*—NECATORINÆ: anterior extremity bent dorsally; buccal capsule subglobular with semilunar ventral cutting plates

at the oral margin, and in its depth two triangular subventral lancets, and two subdorsal (lateral) lancets; duct of the dorsal oesophageal gland opens on the end of a cone projecting into the buccal cavity. Male: bursa symmetrical; with the following formula—ventral ray cleft, externo-lateral and laterals arise from a common trunk, medio-lateral and postero-lateral close together,

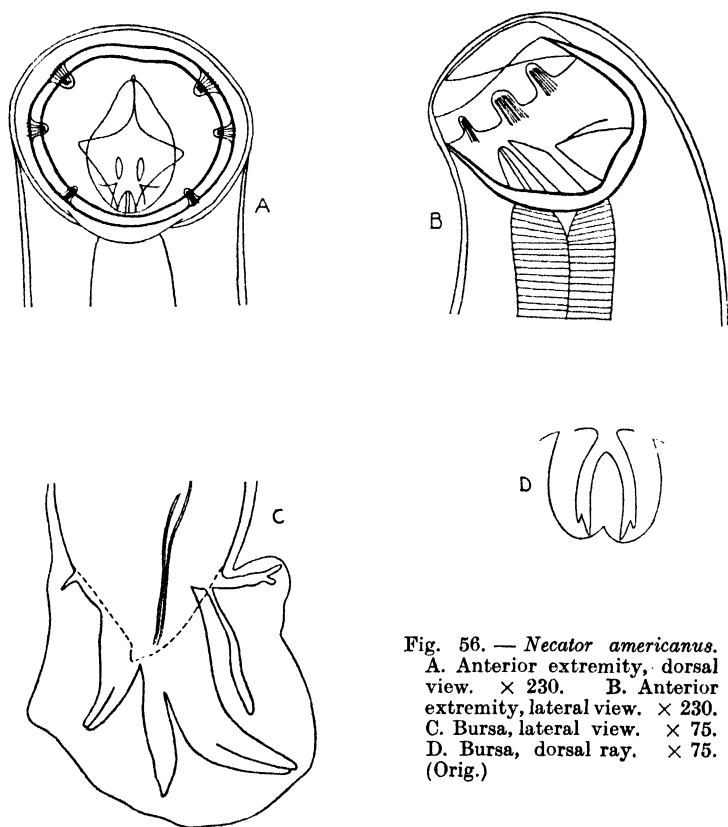


Fig. 56. — *Necator americanus*.  
A. Anterior extremity, dorsal view.  $\times 230$ . B. Anterior extremity, lateral view.  $\times 230$ .  
C. Bursa, lateral view.  $\times 75$ . D. Bursa, dorsal ray.  $\times 75$ .  
(Orig.)

externo-dorsal narrowed at its base and arises from a common trunk with the dorsal, dorsal doubled, each branch being bidigitate; spicules equal and one of them barbed at the tip; gubernaculum absent. Female: vulva near the middle of the body. Parasites of man, chimpanzee, and pig.

Type species: *N. americanus* (Stiles, 1902). ♂ 8 mm., ♀ 10 mm. In man and pig.

Syn., *N. suillus* Ackert and Payne, 1922.

Other species :

*N. exilidens* Looss, 1912. In chimpanzee.

Syn., *N. africanus* Looss, 1911, not Harris, 1910.

*N. congolensis* Gedoelst, 1916. In chimpanzee.

Refs. 1, 80, 188, 198, 199, 261, 360, 426, 458.

Genus **EUMONODONTUS** \* Railliet and Henry, 1910.

Syn., *Monodontus* Molin, 1861; not *Monodonta* Lamarck, 1799.

*Definition.*—**NECATORINÆ**: this genus was erected by Railliet and Henry for the species *Monodontus semicircularis* Molin, 1861, about which little is known. It differs from *Monodontus* in that the externo-dorsal ray is symmetrical. According to Molin's drawing the dorsal ray is deeply divided and each branch is bidigitate. The vulva is a little behind the middle of the body. Parasites of pigs.

Type species: *E. semicircularis* (Molin, 1861). ♂ 6.5–8.5 mm., ♀ 9 mm. In *Dicotyles torquatus*.

Refs. 80, 261, 360, 426, 458, 597.

Genus **BRACHYCLONUS** Railliet and Henry, 1910.

*Definition.*—**NECATORINÆ**: anterior extremity bent dorsally; buccal capsule subglobular with semi-lunar ventral cutting plates

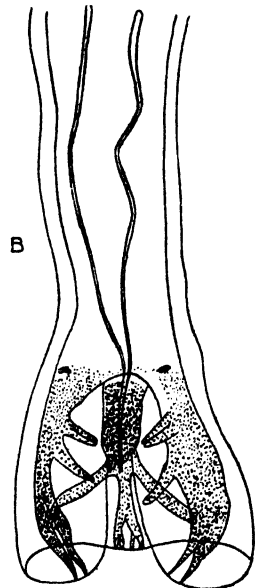
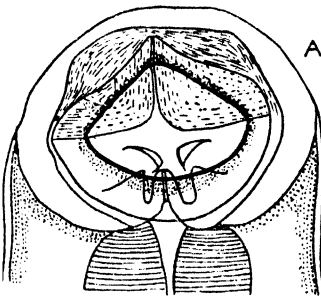


Fig. 57.—*Brachyclonus indicus*. A. Anterior extremity, dorsal view.  $\times 190$ . B. Bursa, dorsal view.  $\times 44$ . (After Khalil.)

\* Possibly the genus is identical with *Necator* which has been found in Brazilian pigs.

at the oral margin, and in its depth two subventral and two sub-dorsal lancets ; dorsal cone present. Male : bursal formula differs from that of *Necator* in that the dorsal ray is not doubled but is

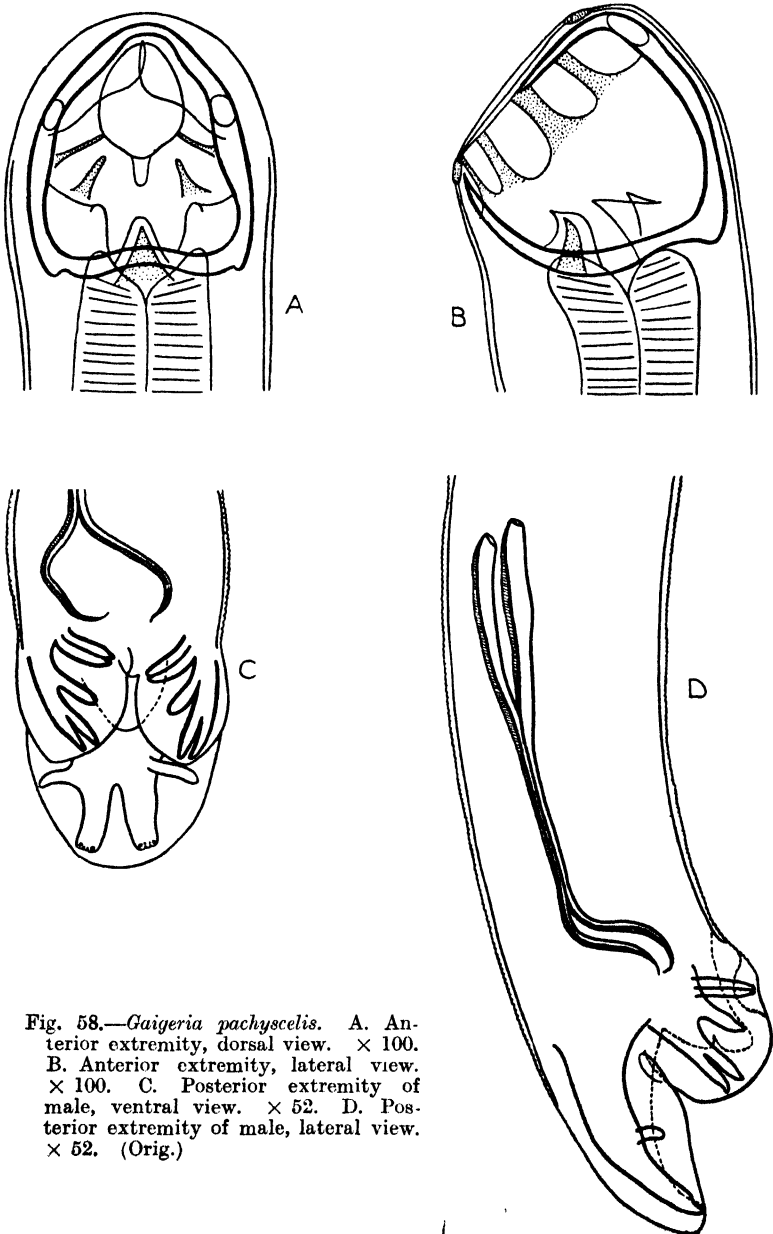


Fig. 58.—*Gaigeria pachyscelis*. A. Anterior extremity, dorsal view.  $\times 100$ . B. Anterior extremity, lateral view.  $\times 100$ . C. Posterior extremity of male, ventral view.  $\times 52$ . D. Posterior extremity of male, lateral view.  $\times 52$ . (Orig.)

forked in its distal portion, the externo-dorsal ray is not narrowed at its base, and the common trunk of the dorsal and externo-dorsal rays is long ; spicules equal and not barbed at the tips ; gubernaculum absent. Female : vulva in the anterior third of the body. Parasites of tapirs.

Type species : *B. indicus* Railliet and Henry, 1910. ♂ 12·5 mm., ♀ 12·15 mm. In *Tapirus indicus*.

Refs. 249, 261, 426.

**Genus GAIGERIA Railliet and Henry, 1910.**

*Definition*.—NECATORINÆ : anterior extremity bent dorsally ; buccal capsule infundibular with two ventral semilunar cutting plates at the oral margin, and in its depth two subventral lancets on the anterior edge of which is a small tubercle : dorsal cone short and sharp. Male : bursa consists of a very large dorsal, and two smaller lateral lobes which are joined together ventrally ; the dorsal lobe is separated from the lateral lobes ; with the following formula—ventral ray cleft, externo-lateral and laterals arise from a common trunk, the externo-lateral is short and blunt, the medio-lateral and postero-lateral are joined in their proximal two-thirds and diverge distally, externo-dorsal arises from a common trunk with the dorsal, dorsal bifurcated almost to its base, each branch being large, blunt, and terminating in three digitations. Female : vulva a little in front of the middle of the body. Parasites of ruminants.

Type species : *G. pachyscelis* Railliet and Henry, 1910. ♂ 11–12 mm., ♀ 15–17 mm. In sheep, goats, and ? cattle.

Refs. 82, 147, 151, 261, 426.

**Genus UNCINARIA Froelich, 1789.**

Syn., *Dochmius* Duj., 1845.

*Dochmoides* Cameron, 1924.

*Definition*.—NECATORINÆ : anterior extremity bent dorsally ; buccal capsule infundibular with two semilunar ventral cutting plates at its oral margin, and in its depth two subventral lancets ; dorsal cone absent. Male : bursa with two large lateral lobes and a small dorsal lobe ; with the following formula—ventral ray cleft, externo-lateral and laterals arise from a common trunk, medio-lateral and postero-lateral separated, externo-dorsal arises from a common trunk with the dorsal, dorsal forked in its distal portion, each branch being bidigitate or tridigitate ; spicules equal ; gubernaculum absent ? Female : vulva at the junction of the



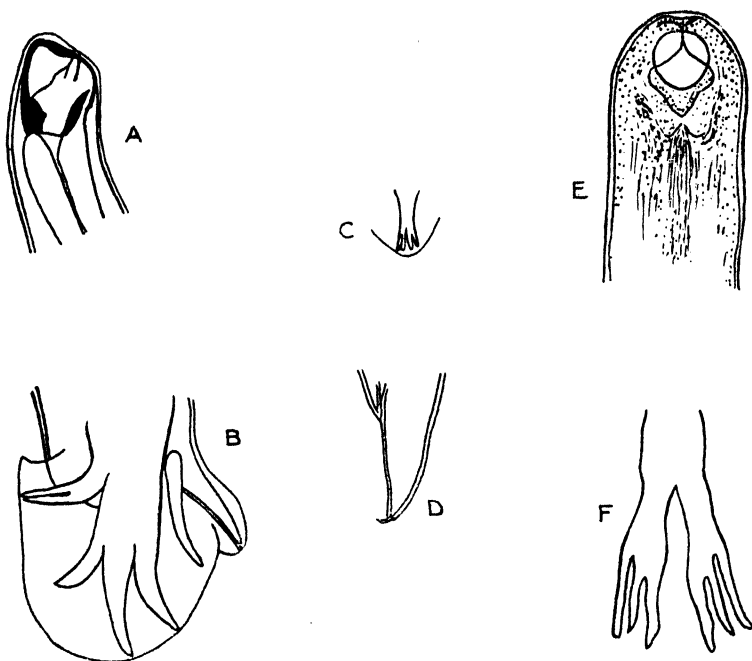


Fig. 59.—*Uncinaria criniformis*. A. Anterior extremity, lateral view.  $\times 120$ . B. Bursa, lateral view.  $\times 120$ . C. Dorsal ray.  $\times 120$ . D. Tail of female.  $\times 120$ . (After Ransom.)  
*Uncinaria stenocephala*. E. Anterior extremity, dorsal view. F. Bursa, dorsal ray. (After Yorke and Blacklock.)

middle and posterior thirds of body. Parasites of carnivora and the domesticated pig.

Type species: *U. criniformis* (Göze, 1782). ♂ 5.5 mm., ♀ 7.5 mm. In *Meles taxus*.

Syn., *Ascaris criniformis* Göze, 1782.

*Dochmius criniformis* (Göze, 1782) Duj., 1845.

Other species: *U. stenocephala* (Railliet, 1884). In dog, fox, cat, and pig.

Syn., *Dochmius stenocephalus* Railliet, 1884.

*U. polaris* Looss, 1911.

*Dochmoides stenocephala* (Railliet, 1884) Cameron, 1924.

Refs. 83, 131, 138, 146, 186, 209, 261, 337, 341, 395, 462.

**Genus GRAMMOCEPHALUS** Railliet and Henry, 1910.

**Definition.**—NECATORINÆ: anterior extremity bent dorsally; buccal capsule infundibular with two semilunar ventral cutting plates at the oral margin, and in its depth one pair of triangular

lateral, and one of subventral, lancets; dorsal cone present. From the dorsal wall of the gut, close to its union with the œsophagus, runs forward a long diverticulum. Male: bursal formula—ventral rays cleft to base, externo-lateral and laterals arise from

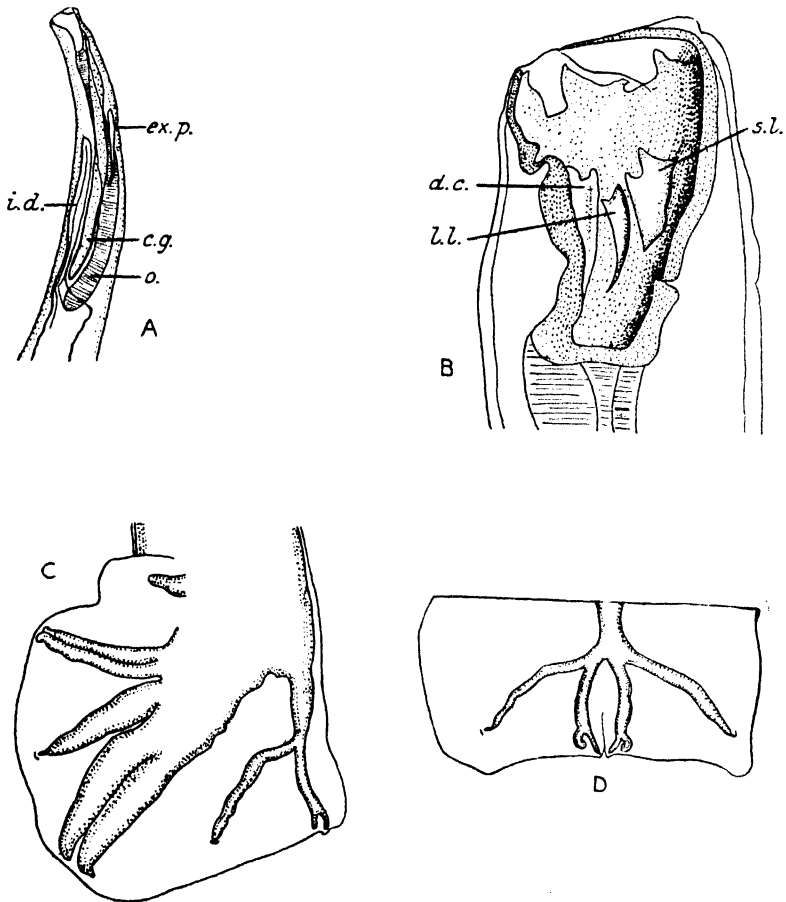


Fig. 60.—*Grammocephalus clathratus*. A. Anterior extremity, lateral view. *ex.p.*, excretory pore; *c.g.*, cephalic glands; *o.*, œsophagus; *i.d.*, intestinal diverticulum.  $\times 13$ . B. Head, lateral view; *d.c.*, dorsal cone; *l.l.*, lateral lancets; *s.l.*, subventral lancets.  $\times 100$ . C. Bursa, lateral view.  $\times 30$ . D. Bursa, dorsal ray.  $\times 30$ . (After Lane.)

a common trunk, medio-lateral and postero-lateral close together, externo-dorsal arises from a common trunk with the dorsal, dorsal doubled, each limb being bidigitate; spicules strong and alate; gubernaculum absent. Female: vulva near middle of body; uteri divergent. Parasites of elephants and rhinoceroses.

Type species : *G. clathratus* (Baird, 1868). ♂ 45 mm., ♀ 36 mm.  
In African elephant.

Syn., *Sclerostoma clathratum* Baird, 1868.

*Strongylus clathratus* (Baird, 1868) Cobbold, 1882.

Other species :

*G. varedatus* Lane, 1921. In Indian elephant.

Syn., *G. clathratus* (Baird, 1868) of Railliet and Henry, 1910.

*G. intermedius* Neveu-Lemaire, 1924. In *Rhinoceros bicornis*.

Refs. 7, 30, 251, 261, 264, 371, 426.

Genus **BATHMOSTOMUM** Railliet and Henry, 1909.

*Definition*.—**NECATORINÆ**: anterior extremity bent dorsally ;  
buccal capsule infundibular, with two semilunar ventral cutting

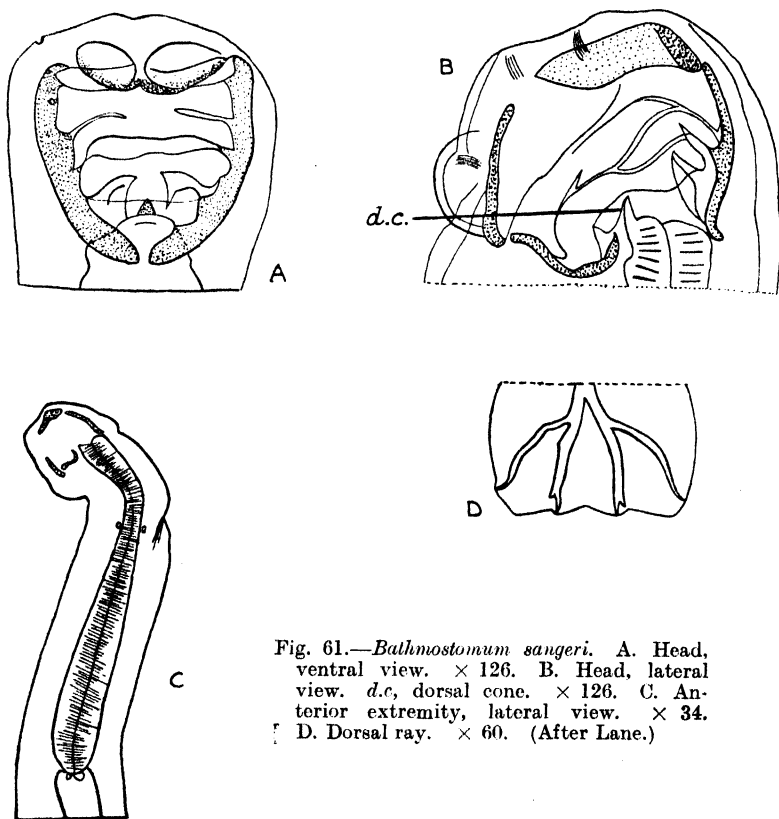


Fig. 61.—*Bathmostomum sangeri*. A. Head, ventral view.  $\times 126$ . B. Head, lateral view. d.c., dorsal cone.  $\times 126$ . C. Anterior extremity, lateral view.  $\times 34$ . D. Dorsal ray.  $\times 60$ . (After Lane.)

plates at its oral margin ; the wall of the capsule is fissured on its dorsal and lateral aspects and its internal surface is raised into a series of circular ridges or lamellæ ; subdorsal lancets are not present

in the depth of the capsule, but possibly there is a pair of sub-ventral lancets in connection with a complete shelf which appears to encircle the whole base of the cavity; dorsal cone very small. Male: bursal formula differs from that of *Necator*, in that the dorsal ray is bifurcate beyond the point of origin of the externo-dorsals, which consequently arise from the branches of the dorsal ray; spicules stout and equal; gubernaculum absent. Female: vulva a little in front of the middle of the body.

Type species: *B. sangeri* (Cobbold, 1879). ♂ 15–16 mm., ♀ 20 mm. In *Elephas indicus*.

Syn., *Dochmius sangeri* Cobbold, 1879.

*Uncinaria sangeri* (Cobbold, 1879) Railliet, 1897.

*Uncinaria os-papillatum* Piana and Stazzi, 1900.

Refs. 103, 251, 261, 264, 392, 420, 426.

Genus **TETRAGOMPHIUS** Baylis and Daubney, 1923.

*Definition*.—NECATORINÆ: anterior extremity bent dorsally, neck long and tapering; buccal capsule cup-shaped, less elongated

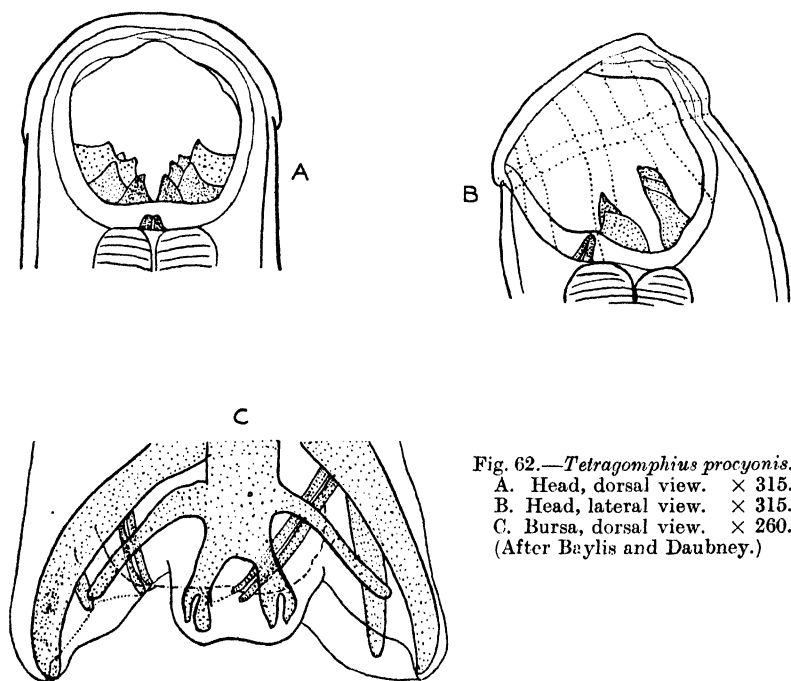


Fig. 62.—*Tetragomphius procyonis*.  
A. Head, dorsal view.  $\times 315$ .  
B. Head, lateral view.  $\times 315$ .  
C. Bursa, dorsal view.  $\times 260$ .  
(After Baylis and Daubney.)

than in *Uncinaria*, with poorly-developed ventral semilunar cutting plates at the oral margin; in its depth are two pairs of

lancets, the subdorsal being bi-cuspid and the subventral bi- or tri-digitate, usually the latter; the dorsal cone is represented by a blunt tubercle. Male: bursa short and stunted; with the following formula—ventral ray cleft, externo-lateral and laterals arise from a common trunk, medio-lateral and postero-lateral separated, externo-dorsal and dorsal arising from a common trunk, dorsal very thick and deeply divided almost to the point of origin of the externo-dorsal rays, each branch being bidigitate; spicules filiform and extremely long. Female: vulva in the posterior fourth of the body.

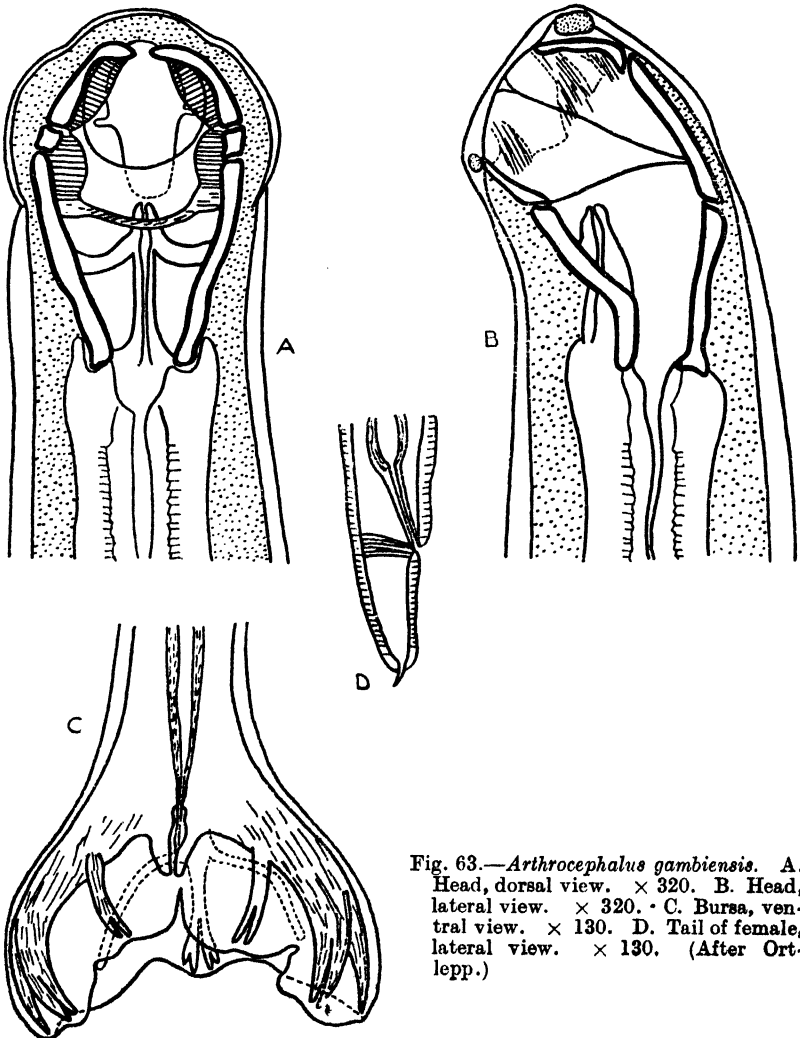


Fig. 63.—*Arthrocephalus gambiensis*. A. Head, dorsal view.  $\times 320$ . B. Head, lateral view.  $\times 320$ . C. Bursa, ventral view.  $\times 130$ . D. Tail of female, lateral view.  $\times 130$ . (After Ortlepp.)

Type species : *T. procyonis* Baylis and Daubney, 1923.  
♂ 13–15 mm., ♀ 15–20 mm. In *Procyon* sp. (Raccoon).  
Refs. 43, 45.

Genus **ARTHROCEPHALUS** Ortlepp, 1925.

*Definition*.—**NECATORINÆ** : anterior extremity bent dorsally. The buccal capsule is composed of a number of chitinous parts articulating with each other : there are six of these ; the largest is a complete funnel-shaped tube and forms the base of the capsule ; a single oval plate forms the antero-ventral wall of the capsule, and on either side of this plate are two additional plates forming respectively the dorso-lateral and the ventro-lateral walls of the capsule ; the two ventro-lateral plates do not meet along the mid-ventral line, but are separated by a V-shaped space. The oral margin of the capsule is armed with two thin semilunar cutting plates arising from the anterior edge of the ventro-lateral plates ; dorsal cone well-developed, but lancets and teeth are not present in the depth of the capsule. Male : bursa with large lateral lobes and a small dorsal lobe ; with the following formula : ventral ray cleft, externo-lateral and laterals arise from a common trunk, externo-dorsal arising from a common trunk with the dorsal, dorsal bifurcated distally, each branch being tridigitate ; spicules equal, thin, and filiform ; gubernaculum present. Female : tail conical and ends in a small spike ; vulva at the junction of the middle and posterior thirds of the body. Oviparous, eggs oval, thin-shelled and contain a morula at deposition. Parasites of mongoose.

Type species : *A. gambiensis* Ortlepp, 1925. ♂ 5–6 mm., ♀ 7–9 mm. In the African mongoose.  
Ref. 381b.

Genus **BUNOSTOMUM** Railliet, 1902.

Syn., *Monodontus* Molin, 1861, in part.  
*Bustomum* Lane, 1917.

*Definition*.—**NECATORINÆ** : anterior extremity bent dorsally ; buccal capsule infundibular with two semilunar ventral cutting plates at its oral margin, and in its depth two small lancets near the opening of the oesophagus, and sometimes also a smaller pair of subventral lancets is found in the lateral walls of the capsule ; dorsal cone well-developed. Male : lateral lobes of bursa continuous ventrally, dorsal lobe slightly-developed and asymmetrical ; with the following formula—ventral, externo-lateral and lateral rays arise from a large common trunk, ventral ray cleft, postero-

lateral and medio-lateral are fused in their proximal portions and separated distally, externo-dorsal arising at different levels from a common trunk with the dorsal ; dorsal bifurcate to a varying

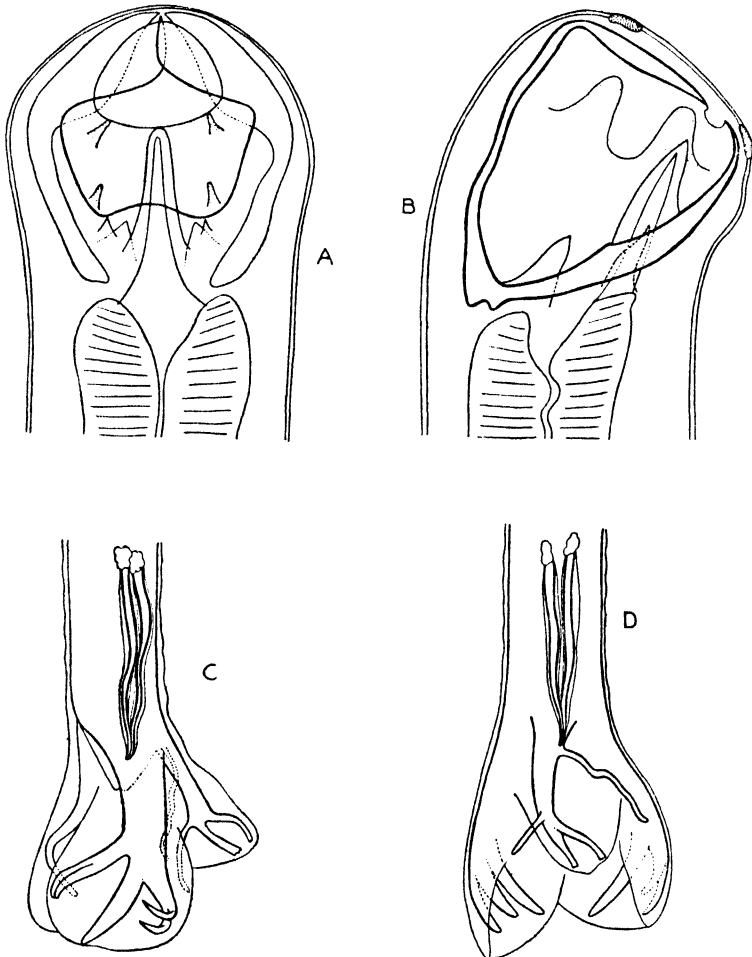


Fig. 64.—*Bunostomum trigonocephalum*. A. Anterior extremity, dorsal view.  $\times 215$ . B. Anterior extremity, lateral view.  $\times 215$ . C. Posterior extremity of male, lateral view.  $\times 46$ . D. Posterior extremity of male, dorsal view.  $\times 56$ . (Orig.)

degree, each branch being bidigitate or tridigitate ; spicules equal ; gubernaculum absent. Female : vulva in front of the middle of the body. Parasites of herbivora.

Type species : *B. trigonocephalum* (Rud., 1808). ♂ 12–17 mm., ♀ 19–26 mm. In sheep, goat, and ox.

Syn., *Strongylus trigonocephalus* Rud., 1808.

*Sclerostoma hypostomum* (Rud., 1819) Duj., 1845.

*Monodontus wedlii* Molin, 1861.

*Dochmius cernuus* (Crep., 1829) Baillet, 1868.

*Uncinaria cernua* (Crep., 1829) Railliet, 1885.

*Monodontus trigonocephalus* (Rud., 1809) Railliet, 1902.

*Bunostomum kashinathi* Lane, 1917.

Other species : *B. phlebotomum* (Railliet, 1900). In cattle and sheep.

Syn., *Strongylus radiatus* Rud., 1803, of Schneider, 1866.

*Bunostomum radiatum* (Rud. of Schneider, 1866) Linstow, 1906.

*Bustomum phlebotomum* (Railliet, 1900) Lane, 1917.

? *B. longecirratum* (Linst., 1879). In the yak.

? *B. foliatum* (Cobbold, 1882). In elephants.

Syn., *Uncinaria sangeri* Aless., 1905, not Railliet, 1897.

Refs. 80, 261, 401, 402, 426, 458, 597.

#### Genus **MONODONTELLA** n. g.

*Definition*.—NECATORINÆ : anterior extremity bent dorsally ; buccal capsule infundibular with two semilunar ventral cutting plates at its oral margin and with a very well-marked dorsal cone, but without lancets in its depth : on each side of the capsule are the broad bands of pulp of the head papillæ ; œsophagus club-shaped, cervical papillæ at the level of the nerve ring. Male : bursa markedly asymmetrical, the right lateral lobe being distinctly larger than the left ; the lateral lobes meet ventrally, and the dorsal lobe is broad and much shorter than the laterals and not sharply marked off ; with the following formula—on the right side the ventro-ventral and latero-ventral rays are completely fused and long and slender, the externo-lateral and laterals are fused into a large single ray, which is divided only at its extremity, the dorsal branch being broad and the ventral smaller and subdivided into two digitations, the externo-dorsal arises separately from the dorsal and is long and delicate ; on the left side the ventral, externo-lateral, laterals, and externo-dorsal rays all arise from a common trunk, the ventral is completely fused into a single ray, the medio-lateral and postero-lateral are quite separate and the externo-dorsal is fused with the postero-lateral for about half its length ; the dorsal ray commences as a thick trunk, and then breaks up into a short median stem with two longer lateral branches on each side, those on the left side being



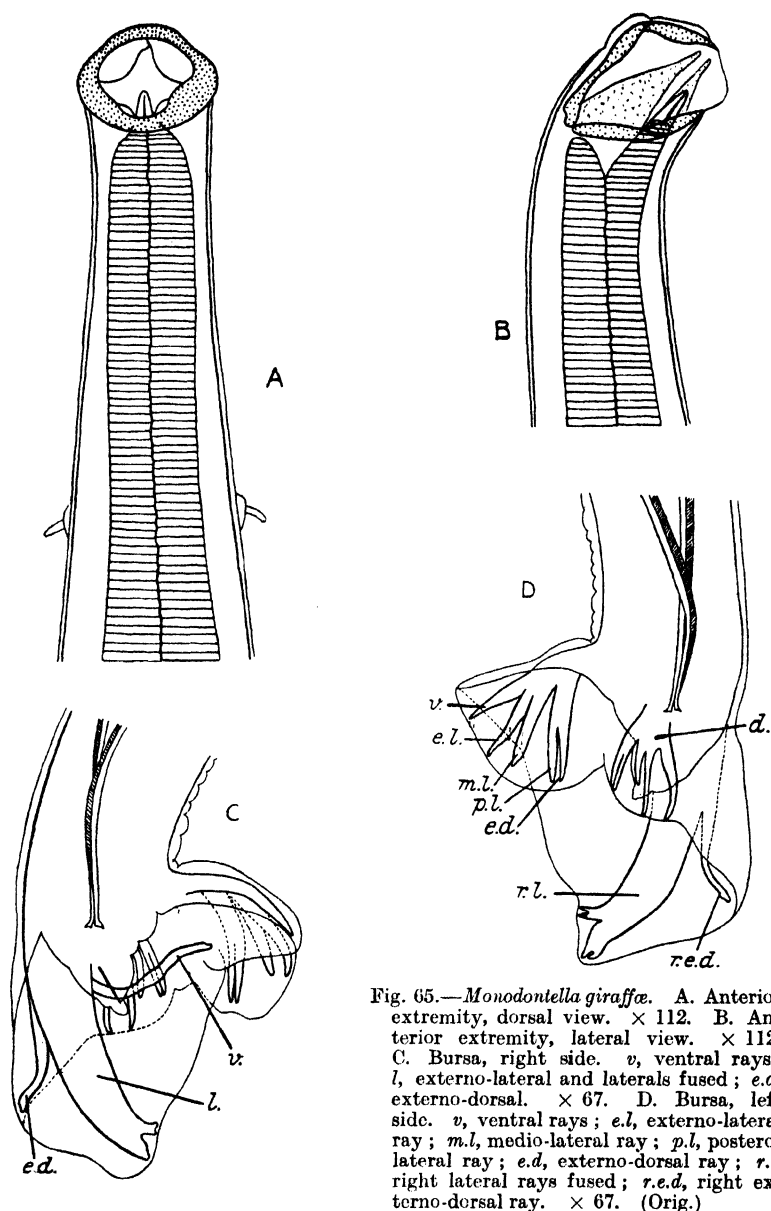


Fig. 65.—*Monodontella giraffæ*. A. Anterior extremity, dorsal view.  $\times 112$ . B. Anterior extremity, lateral view.  $\times 112$ . C. Bursa, right side. *v*, ventral rays; *l*, externo-lateral and laterals fused; *e.d.*, externo-dorsal.  $\times 67$ . D. Bursa, left side. *v*, ventral rays; *e.l.*, externo-lateral ray; *m.l.*, medio-lateral ray; *p.l.*, postero-lateral ray; *e.d.*, externo-dorsal ray; *r.l.*, right lateral rays fused; *r.e.d.*, right externo-dorsal ray.  $\times 67$ . (Orig.)

more or less fused, whilst those on the right are clearly separate; spicules equal, alate and fused distally, with barbed tips. Female: posterior extremity conical; vulva slightly in front of the middle of the body, uteri divergent. Oviparous. Parasites of giraffes.

Type species : \* *M. giraffæ* n. sp. ♂ 14–16 mm., ♀ 18–20 mm.  
In the giraffe.

FAMILY DIAPHANOCEPHALIDÆ TRAVASSOS, 1919.

*Definition*.—STRONGYLOIDEA : buccal capsule bivalvular and strongly compressed laterally. Parasites of stomach and intestine of snakes.

KEY TO GENERA.

1. With two chitinous ledges in lateral walls of capsule, and with delicate chitinous processes projecting into the capsule from the ventral cuticular pad. . . . . *Diaphanocephalus*, p. 111.  
With only one chitinous ledge in lateral walls of capsule, and without delicate chitinous processes projecting into the capsule from the ventral cuticular pad . . . . . 2
2. With a distinct corona radiata, and with three teeth in œsophageal funnel . . . . . *Occipitodontus*, p. 114.  
Without a corona radiata, and without teeth in œsophageal funnel . . . . . *Kalicephalus*, p. 113.

Genus **DIAPHANOCEPHALUS** Diesing, 1851.

*Definition*.—DIAPHANOCEPHALIDÆ : anterior extremity obliquely truncated, so that the mouth opens slightly dorsally ; buccal capsule compressed laterally and consisting of two valves each with a much thickened base ; on the axial surface of each valve are two ledges projecting inwards, an anterior running parallel with the oral margin, and a posterior which has the shape of an arc when viewed laterally, the terminations of each posterior ledge rest on a thickened cuticular pad situated between the junctions of the buccal valves ; from the ventral cuticular pad two membranous cuticular processes project into the mouth cavity : on

\* *Monodontella giraffæ* n. sp. Length of male 14–16 mm., female 18–20 mm. Length of œsophagus in female about 1.4 mm. Cervical papillæ are about 530–540  $\mu$  from the anterior extremity. Buccal capsule about 200–220  $\mu$  in depth and about 150  $\mu$  in greatest diameter at the oral margin. Spicules 700–750  $\mu$  in length, equal, winged, and fused distally, with barbed tips. In the female the anus is about 230–240  $\mu$  from the tip of the tail, and the vulva is just in front of the middle of the body.

the outer surface of each valve are three parenchymatous bands arising from a basal collar, these terminate as the head papillæ. The duct of the dorsal œsophageal gland projects well into the mouth cavity. Male : bursa short and campanulate, its depth being about the same on its dorsal and ventral aspects, there is only a slight indication of a dorsal lobe ; with the following formula—ventral rays cleft, externo-lateral and laterals arise

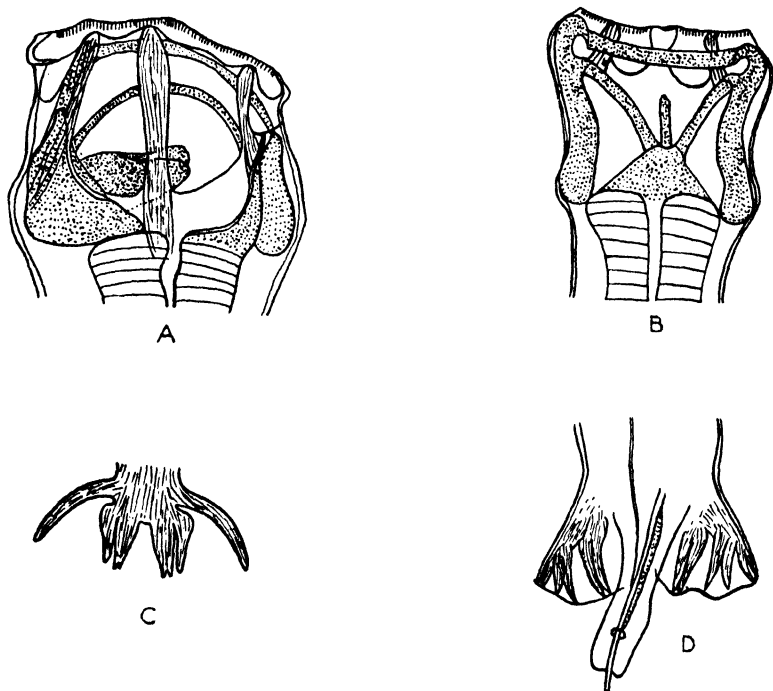


Fig. 66.—*Diaphanocephalus galeatus*. A. Head, lateral view.  $\times 94$ . B. Head, dorso-ventral view.  $\times 94$ . C. Bursa, dorsal ray.  $\times 80$ . D. Bursa, ventral view.  $\times 80$ . (After Ortlepp.)

from a common trunk, medio- and postero-lateral separated, externo-dorsal arises from a common trunk with the dorsal, which is very short and thick, and almost immediately divides into two branches, which again immediately subdivide, the inner of the two subdivisions being bifid at its extremity ; genital cone is very long and protrudes beyond the bursa, the anogenital orifice is situated on its ventral surface some distance in front of its tip ; spicules equal ? ; gubernaculum present ; there is a dorsal hump anterior to the bursa. Female : tail short and pointed ; vulva in the posterior fourth of the worm. Oviparous: Parasites of snakes.

Type species : *D. galeatus* (Rud., 1819). ♂ and ♀ about 4 mm.  
In intestine of *Podinema teguixin*.

Syn., *Strongylus galeatus* Rud., 1819.

*Diaphanocephalus stronglyloides* Dies., 1851.

Refs. 42, 119, 123, 360, 381, 405, 477, 573.

Genus **KALICEPHALUS** Molin, 1861.

Syn., *Diaphanocephalus* Diesing, 1851, in part.

**Definition.**—**DIAPHANOCEPHALIDÆ** : head and buccal capsule closely resembling those of *Diaphanocephalus*, but differing in the absence of the second chitinous ledge in the lateral walls of the

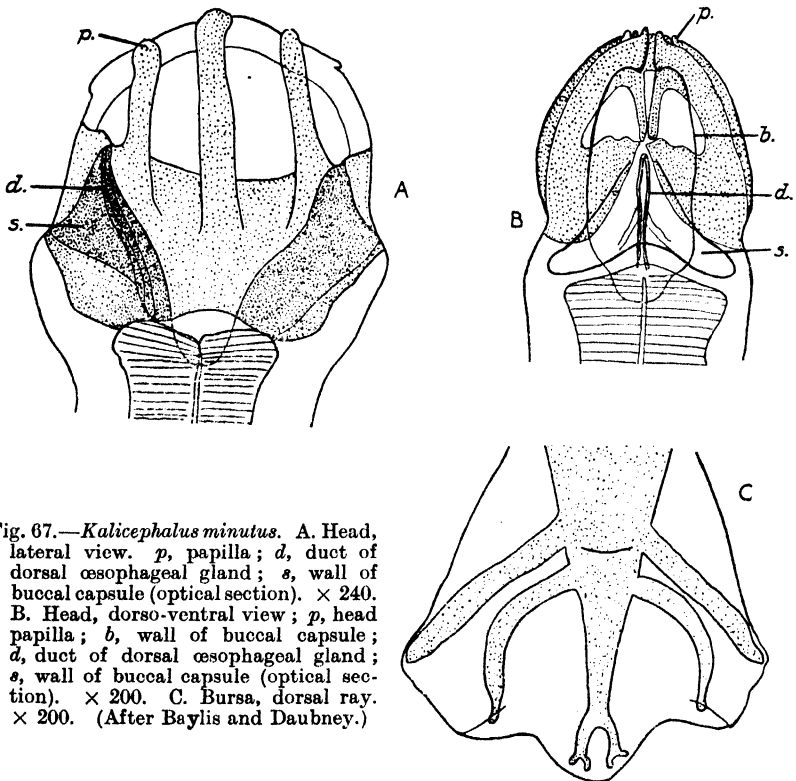


Fig. 67.—*Kalicephalus minutus*. A. Head, lateral view. *p*, papilla; *d*, duct of dorsal oesophageal gland; *s*, wall of buccal capsule (optical section). × 240. B. Head, dorso-ventral view; *p*, head capsule; *b*, wall of buccal capsule; *d*, duct of dorsal oesophageal gland; *s*, wall of buccal capsule (optical section). × 200. C. Bursa, dorsal ray. × 200. (After Baylis and Daubney.)

capsule, and in the absence of the two delicate chitinous projections into the mouth from the ventral chitinous mass. Male : bursa definitely trilobed ; bursal formula as in *Diaphanocephalus*, but the externo-dorsal ray arises higher up the common trunk,

with the result that the dorsal ray is longer ; genital cone usually long, but not so long as in *Diaphanocephalus*, and the anogenital orifice is on the tip of the cone ; spicules equal and alate ; gubernaculum present. Female : posterior extremity long and conical ; vulva in the posterior part of the body ; uteri divergent or convergent. Oviparous. Parasites of snakes.

Type species : *K. mucronatus* Molin, 1861. ♂ 9 mm., ♀ 15–30 mm. In *Crotalus horridus*.

Other species :

*K. appendiculatus* Molin, 1861. In *Ophis* spp., *Coluber* sp., *Leptophis* sp., etc.

*K. boæ* (R. Blanchard, 1886). In *Boa constrictor*.

*K. bothropis* Molin, 1861. In *Bothrops* sp.

*K. brevipenis* Molin, 1861. In *Ophis* sp. and *Dryophis* sp.

*K. colubri* Orllepp, 1923. In Colubrine snake.

*K. coronellæ* Orllepp, 1923. In *Coronella triangulum*.

*K. costatus* (Rud., 1819). In *Hylophis* sp., *Lachesis* sp., etc.

Syn., *Diaphanocephalus costatus* (Rud., 1819) Dies., 1851.

*K. ersiliae* (Stoss., 1896). In *Python molurus*.

*K. indicus* Orllepp, 1923. In *Zamenis* sp. and *Tropidonotus* sp.

*K. inermis* Molin, 1861. In *Bothrops* sp. and *Crotalus horridus*.

*K. micrurus* (Daubney, 1923). In *Macrelaps* sp.

*K. minutus* (Baylis and Daubney, 1922). In *Naja* sp., *Bungarus* sp.

*K. nigeriensis* Orllepp, 1923. In Nigerian snake.

*K. obliquus* (Daubney, 1923). In *Bitis gabonica*, etc.

*K. parvus* Orllepp, 1923. In *Coronella getula*.

*K. philodryadus* Orllepp, 1923. In *Philodryas serra*.

*K. simus* (Daubney, 1923). In Black mamba.

*K. strumosus* Molin, 1861. In *Coluber lichtensteinii*.

*K. subulatus* Molin, 1861. In *Boa constrictor*.

*K. valleii* (Stoss., 1895). In *Vipera ammodytes*.

*K. viperæ* (Rud., 1819). In *Vipera redii*.

*K. willeyi* Linstow, 1904 (not 1908). In *Vipera russelli* and *Coluber helena*.

N.B.—Probably many of the above are synonymous.

Refs. 42, 119, 123, 325, 328, 330, 360, 381, 420, 477, 573.

#### Genus OCCIPITODONTUS Orllepp, 1923.

*Definition*.—DIAPHANOCEPHALIDÆ: closely related to *Kalichephalus*, but differing in the presence of a distinct corona radiata, and three pointed teeth in the œsophageal funnel.

Type species : *O. fimbriatus* Ortlepp, 1923. ♂ 10·5–11·5 mm.,  
♀ 15–17 mm. In *Bungarus fasciatus*, *Coluber* sp., *Vipera* sp., etc.

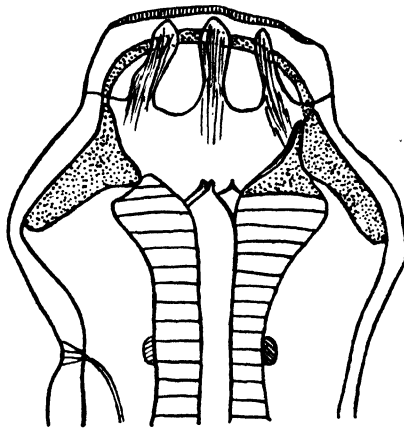


Fig. 68.—*Occipitodontus fimbriatus*. Anterior extremity, lateral view.  
× 110. (After Ortlepp.)

Syn., *Kalicephalus willeyi* Linstow, 1908 (not 1904).

*Diaphanocephalus willeyi* (Linstow) Baylis and Daubney, 1922.

*Diaphanocephalus willeyi* (Linstow) Daubney, 1923.

Refs. 42, 119, 330, 381.

#### FAMILY TRICHOSTRONGYLIDÆ LEIPER, 1912.

*Definition*.—STRONGYLOIDEA : body more or less filiform, mouth simple directed straight forwards ; buccal capsule usually absent or rudimentary, occasionally relatively well-developed, without anterior cutting organs or corona radiata. Bursa copulatrix with well-developed lateral lobes, dorsal lobe either not differentiated or very small ; near the cloaca is often to be found a supporting structure of variable form known as the "telamon." Parasites in the alimentary canal of vertebrates.

#### KEY TO SUBFAMILIES. .

1. Genitalia of female single . . . . . Heligmosominæ, p. 140.  
Genitalia of female double . . . . . 2
2. Buccal capsule relatively large . . . . . Amidostominæ, p. 152.  
Buccal capsule rudimentary or  
absent . . . . . Trichostrongylinae, p. 116.
3. *Trichostrongylidæ* insufficiently known, p. 151.

## Subfamily TRICHOSTRONGYLINÆ Leiper, 1908.

*Definition.*—TRICHOSTRONGYLIDÆ: more or less filiform worms; buccal capsule rudimentary or absent. Spicules either long and filiform, or short and stout with crests and protuberances. Female with double genitalia.

## KEY TO GENERA.

1. Head with umbellate membrane thickened at its edges . . . Histiostrongylus, p. 132.  
     Head without umbellate membrane . . . . . 2
2. Spicules short and stout with crests and protuberances . . . 3  
     Spicules long and filiform . . . . . 14
3. Dorsal lobe of bursa asymmetrical . . . Hæmonchus, p. 122.  
     Dorsal lobe of bursa symmetrical . . . . . 4
4. Accessory bursal membrane present . . . . . Ostertagia, p. 124.  
     Accessory bursal membrane absent . . . . . 5
5. Ventro-ventral and latero-ventral rays of bursa practically of equal size . . . . . 6  
     Ventro-ventral ray of bursa much smaller than the latero-ventral . . . . . 10
6. Externo-lateral ray very short, about half the length of the other lateral rays . . . . . Molineus, p. 125.  
     Externo-lateral ray about same length as the other lateral rays . . . . . 7
7. Gubernaculum absent; ventro-ventral and latero-ventral rays closely approximated for their whole length as also are the medio- and postero-lateral rays . . . Oswaldocruzia, p. 126.  
     Gubernaculum present; ventro-ventral and latero-ventral rays definitely separated as also are the medio- and postero-lateral . . . . . 8
8. Ventro-ventral and latero-ventral rays widely divergent at the tips, prebursal papillæ absent . . . Trichohelix, p. 121.

- Ventro-ventral and latero-ventral  
rays not widely divergent at  
tips, prebursal papillæ present. 9
9. Dorsal ray bifurcate for half its  
length . . . . . Ornithostrongylus, p. 127.  
Dorsal ray undivided except at  
its tip . . . . . Hyostrongylus, p. 120.
10. Gubernaculum absent . . . . . 11  
Gubernaculum present . . . . . 13
11. Ventro-ventral and latero-ventral  
rays approximating at their  
tips; spicules cleft distally  
and ending in two barbed  
processes . . . . . Obeliscoides, p. 129.  
Ventro-ventral and latero-ventral  
rays not approximating at their  
tips; spicules not cleft distally. 12
12. Cervical papillæ present and pre-  
bursal papillæ large . . . . . Travassosius, p. 130.  
Cervical papillæ absent and pre-  
bursal papillæ absent . . . . . Cooperia, p. 131.
13. Dorsal ray bifurcate at its ex-  
tremity, each limb being bi-  
digitate . . . . . Trichostrongylus, p. 118.  
Dorsal ray bifurcate in its distal  
portion each limb giving off two  
lateral branches the first of  
which may, however, arise  
from the undivided trunk . . . . . Libyostrongylus, p. 119.
14. Vulva in anterior fourth of body. Nematodirella, p. 140.  
Vulva in posterior part of body. 15
15. Bursa with asymmetrical lateral  
lobes . . . . . Austrostrongylus, p. 137.  
Bursa with symmetrical lateral  
lobes . . . . . 16
16. Spicules with multiple tips . . . . . Graphidium, p. 134.  
Spicules with simple tips . . . . . 17
17. Ventro-ventral and latero-ventral  
rays equal and parallel . . . . . Nematodirus, p. 135.  
Ventro-ventral and latero-ventral  
rays widely divergent, the  
ventro-ventral being much  
smaller than the latero-ventral 18



18. Cervical papillæ present, vulva  
close to anus . . . . . Mecistocirrus, p. 138.  
Cervical papillæ absent, vulva  
not close to anus . . . . . Graphidioides, p. 139.

Genus **TRICHOSTRONGYLUS** Looss, 1905.

*Definition.*—**TRICHOSTRONGYLINÆ**: head small (usually about  $10\mu$  in diameter); mouth with three small lips; buccal cavity not well defined; cervical papillæ absent. Male: bursa with

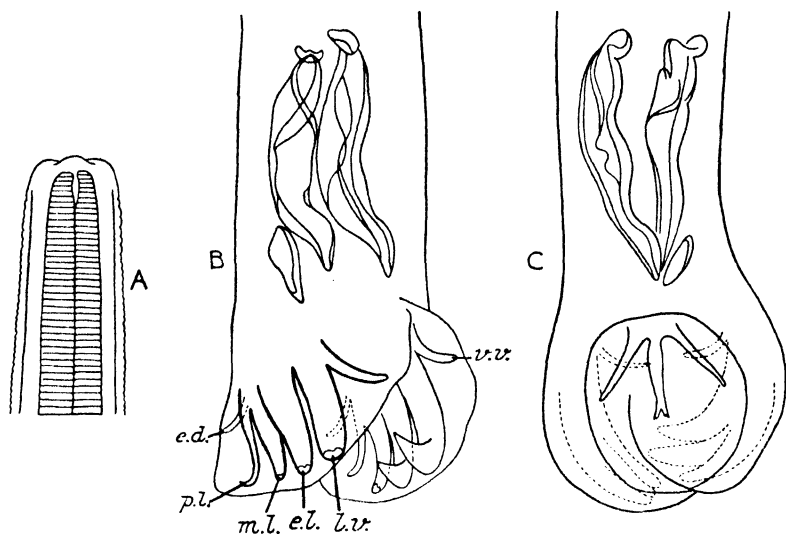


Fig. 69.—*Trichostrongylus retortaeformis*. A. Anterior extremity, ventral view.  $\times 900$ . B. Bursa, lateral view. *v.v.*, ventro-ventral ray; *l.v.*, latero-ventral ray; *e.l.*, externo-lateral ray; *m.l.*, medio-lateral ray; *p.l.*, postero-lateral ray; *e.d.*, externo-dorsal ray.  $\times 260$ . C. Bursa, dorsal view.  $\times 260$ . (Orig.)

large lateral lobes, dorsal lobe either not differentiated or very slightly so; with the following formula—ventro-ventral and latero-ventral rays widely separated, the ventro-ventral being much thinner and smaller than the latero-ventral, externo-lateral, medio-lateral, and postero-lateral arise separately, externo-dorsal arises from the base of the dorsal, dorsal bifurcate near its extremity, each branch being bidigitate; spicules short, twisted and spoon- or spatula-shaped, the proximal end is thickened with a knob or disc-like process, toward the distal end a more or less prominent angular projection is usually present giving the point of the spicules a hooked or barbed appearance; gubernaculum present, elongate and boat- or shoe-shaped in profile; prebursal

papillæ small. Female : vulva in the posterior half of the body, slit-like or crescentic, surrounded by somewhat protruding chitinous lips ; postanal portion of body of female relatively short, with a pair of small caudal papillæ near the tip. Oviparous. Parasites of mammals and more rarely of birds.

Type species : *T. retortæformis* (Zeder, 1800). ♂ 5-7 mm., ♀ 7-9 mm. In *Lepus timidus* and *Lepus cuniculus*.

Syn., *Strongylus retortæformis* Zeder, 1800.

Other species :

*T. affinis* Graybill, 1924. In rabbit.

*T. axei* (Cobbold, 1879). In equines, etc.

*T. calcaratus* Ransom, 1911. In *Sylvilagus floridanus*.

*T. capricola* Ransom, 1907. In goat, sheep, and antelope.

*T. colubriiformis* (Giles, 1892). In sheep.

*T. delicatus* Hall, 1916. In *Sciurus aberti mimus*.

*T. extenuatus* (Railliet, 1898). In cattle, sheep, goat, antelope, and deer.

Syn., *Strongylus gracilis* McFadyean, 1896, not Leuck., 1842.

*T. falculatus* Ransom, 1911. In *Capra hircus*.

*T. fiberius* Barker and Noyes, 1915. In *Fiber zibethicus*.

*T. instabilis* (Railliet, 1893). In sheep, gazelle, camel, baboon, man, goat, deer, etc.

Syn., *Strongylus subtilis* Looss, 1895.

*T. orientalis* Jimbo, 1914. In man.

*T. pergracilis* (Cobbold, 1873). In *Lagopus scoticus*.

*T. pigmentatus* (Linstow, 1904). *Lepus nigricollis*.

*T. probolurus* (Railliet, 1896). In *Camelus dromedarius*.

*T. rugatus* Monn'g, 1925. In sheep.

*T. tenuis* (Mehl., 1846). In *Anser* spp., etc.

*T. vitrinus* Looss, 1905. In sheep, camel, man, and goat.

Refs. 203, 205, 245, 275, 290, 343, 363a, 458, 460, 642.

#### Genus LIBYOSTRONGYLUS\* Lane, 1923.

*Definition*.—TRICHOSTRONGYLINÆ : cephalic cuticle sometimes inflated, buccal cavity minute. Male : bursa with large lateral lobes elongated dorsally to form sometimes a small dorsal lobe ; with the following formula—ventro-ventral and latero-ventral rays widely separate, the ventro-ventral being much smaller and thinner than the latero-ventral, the externo-lateral, medio-lateral, and postero-lateral arise separately, the externo-dorsal arises

\* This genus resembles *Trichostrongylus* very closely, and we are doubtful whether it should be separated from it.

from the base of the dorsal and is short, not reaching the bursal margin, dorsal bifurcate in its distal portion, and giving off two lateral branches, the first of which may arise from the undivided trunk; prebursal papillæ present; spicules equal, stout, slightly curved, and giving off a dorsal spine distally; gubernaculum imperfectly chitinized. Female: vulva in the posterior fifth of the body. Oviparous. Parasites of mammals and birds.

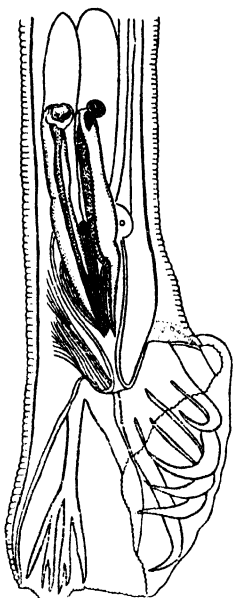


Fig. 70.—*Libyostrongylus douglassii*. Posterior extremity of male, ventral view.  $\times 166$ . (After Theiler and Robertson.)

Type species: *L. douglassii* (Cobbold, 1882). ♂ 4.2 mm., ♀ 5.1 mm. In *Struthio camelus*.

Syn., *Strongylus douglassii* Cobbold, 1882.

*Strongylus douglasi* Geddes, 1911.

*Trichostrongylus douglasi* (Cobbold, 1882) Theiler and Robertson, 1915.

*Ornithostrongylus douglasi* (Cobbold, 1882) Traavassos, 1918.

Other species: *L. hebreunicutus* Lane, 1923. In gorilla.

Refs. 104, 268, 614, 642.

#### Genus **HYOSTRONGYLUS** Hall, 1921.

**Definition.**—**TRICHOSTRONGYLINÆ**: head small; cervical papillæ present. Male: bursa with a small dorsal lobe and well-developed lateral lobes; with the following formula—ventro-ventral and latero-ventral rays diverge slightly, but the latero-ventral, which is a little larger than the ventro-ventral, bends back near its extremity to end close to the ventro-ventral, externo-lateral lies close to the medio-lateral, they diverge only at their tips; postero-lateral widely separated from the medio-lateral, externo-dorsal arises separately from the dorsal and is short, dorsal bifurcate near the tip with two small branches arising from the common trunk; spicules equal, short, tapering to a point with a wavy ridge running the length of the spicule and supporting a curved membranous portion which terminates in a second point; gubernaculum long, narrow, and partly chitinized; ventral to the

gubernaculum is a transparent structure known as the telamon ; prebursal papillæ present. Female : vulva in the posterior sixth of the worm. Oviparous. Parasites of pigs.

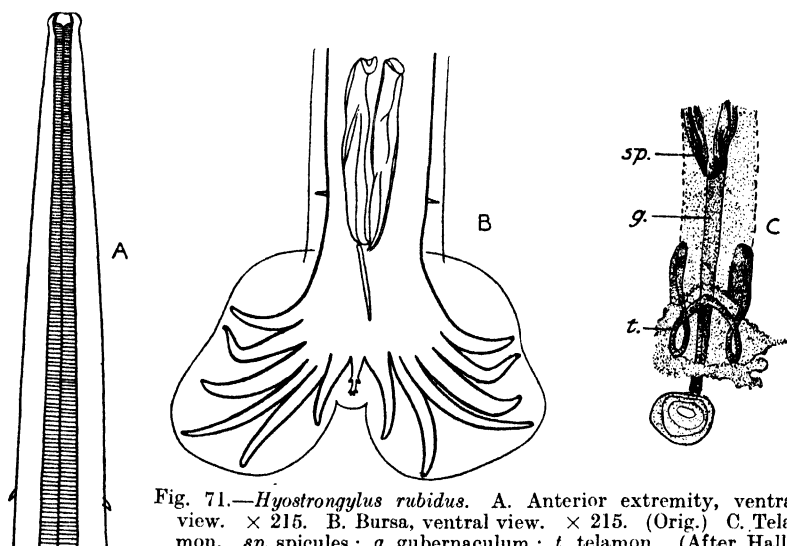


Fig. 71.—*Hyostrongylus rubidus*. A. Anterior extremity, ventral view.  $\times 215$ . B. Bursa, ventral view.  $\times 215$ . (Orig.) C. Telamon. *sp*, spicules ; *g*, gubernaculum ; *t*, telamon. (After Hall.)

Type species : *H. rubidus* (Hassall and Stiles, 1892). ♂ 4–5 mm., ♀ 5–8 mm. In pigs.

Syn., *Strongylus rubidus* Hassall and Stiles, 1892.

*Ostertagia rubida* (Hassall and Stiles, 1892) Travassos, 1918.

*Strongylus attenuatus* Molin, 1860, not Leidy, 1856.

Refs. 193, 207, 211, 271, 359, 642.

#### Genus **TRICHOHELIX** Ortlepp, 1922.

**Definition.**—**TRICHOSTRONGYLINÆ** : body spirally coiled ; head round and thick ( $35\ \mu$  in diameter). Cuticle of head inflated in the form of a vesicular swelling limited behind by a deep constriction encircling the neck, the rest of the cuticle strikingly inflated, and showing marked transverse striations only on the anterior half of the ventral surface, longitudinal striations faint ; lateral alæ absent ; cervical papillæ absent. Male : bursa indistinctly trilobed ; with the following formula—ventro-ventral and latero-ventral rays of about the same size but very divergent, externo-lateral separate from the other lateral rays which are close together, externo-dorsal arises from a common trunk with the dorsal, dorsal bifurcate, each branch tridigitate ; prebursal papillæ absent ;

spicules straight, of medium size, equal and branched at their distal extremities; gubernaculum present. Female: vulva slightly in front of the anus; uteri parallel. Oviparous, eggs with thin shell. Parasites of the armadillos.

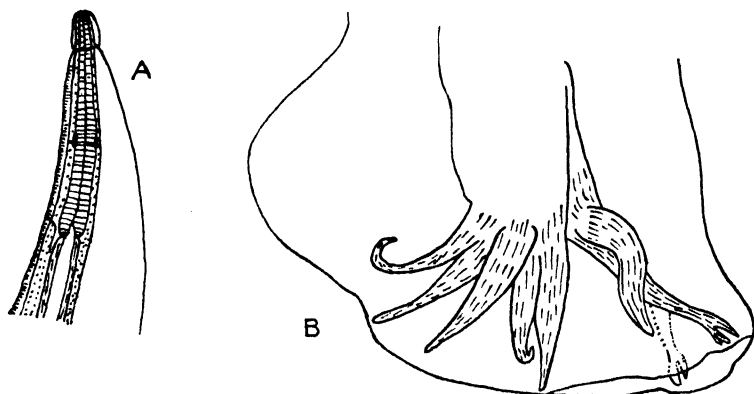


Fig. 72.—*Trichohelix tuberculata*. A. Anterior extremity, dorso-ventral view.  $\times 68$ . B. Bursa, lateral view.  $\times 230$ . (After Ortlepp.)

Type species: *T. tuberculata* (Parona and Stoss., 1901).  
 $\sigma$  6.6 mm.,  $\phi$  8.75 mm. In the armadillo.

Syn., *Æsophagostomum tuberculatum* Parona and Stoss., 1901.

Refs. 376, 388.

Genus **HÆMONCHUS** Cobb, 1898.

Syn., ? *Abomesi* Simmonds, 1881.

**Definition.**—TRICHOSTRONGYLINÆ: head relatively large (less than  $50\mu$  in diameter), lips inconspicuous, buccal cavity small, with a slender tooth or lancet originating from the dorsal side of its base; cervical papillæ prominent. Male: bursa with large lateral lobes and a small asymmetrical dorsal lobe; with the following formula—ventro-ventral and latero-ventral rays fused proximally and separated distally, externo-lateral separate from the other lateral rays, externo-dorsal arises separately from the dorsal and is long and thin, dorsal bifurcate, each limb being bidigitate, it takes origin from the left side near the left externo-dorsal; spicules relatively short (less than 1 mm. long); gubernaculum present. Female: vulva in the posterior part of the body and covered by a prominent flap projecting caudally. Oviparous. Parasites of ruminants.

Type species: *H. contortus* (Rudolphi, 1803).  $\sigma$  10–20 mm.,  $\phi$  18–30 mm. In sheep, goat, mouse, man, etc.

Syn., *Strongylus contortus* Rud., 1803.

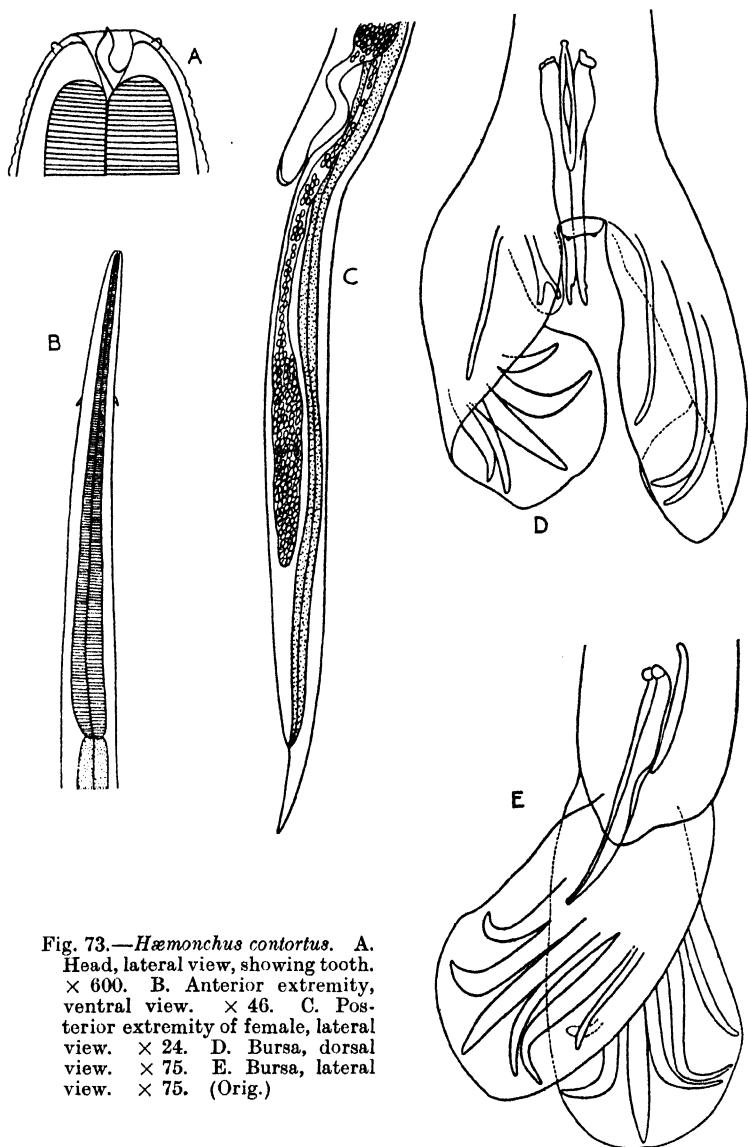


Fig. 73.—*Hæmonchus contortus*. A. Head, lateral view, showing tooth.  $\times 600$ . B. Anterior extremity, ventral view.  $\times 46$ . C. Posterior extremity of female, lateral view.  $\times 24$ . D. Bursa, dorsal view.  $\times 75$ . E. Bursa, lateral view.  $\times 75$ . (Orig.)

Other species :

*H. bispinosus* (Molin, 1860). In *Mazama nana*.

*H. cervinus* Baylis and Daubney, 1922. In *Cervus axis*.

*H. longistipes* Railliet and Henry, 1909. In camel.

*H. lunatus* Travassos, 1914. In *Bos taurus*.

*H. similis* Travassos, 1914. In *Bos taurus*.

Refs. 42, 67, 97, 419, 455, 458, 642, 653.

Genus *OSTERTAGIA* Ransom, 1907.

*Definition.*—*TRICHOSTRONGYLINÆ*: head less than  $25\mu$  in diameter with a small buccal cavity; cervical papillæ present. Male: bursa with two lateral lobes united by a small median lobe; with the following formula—ventro-ventral and latero-ventral rays close together, externo-lateral separate from the other laterals,

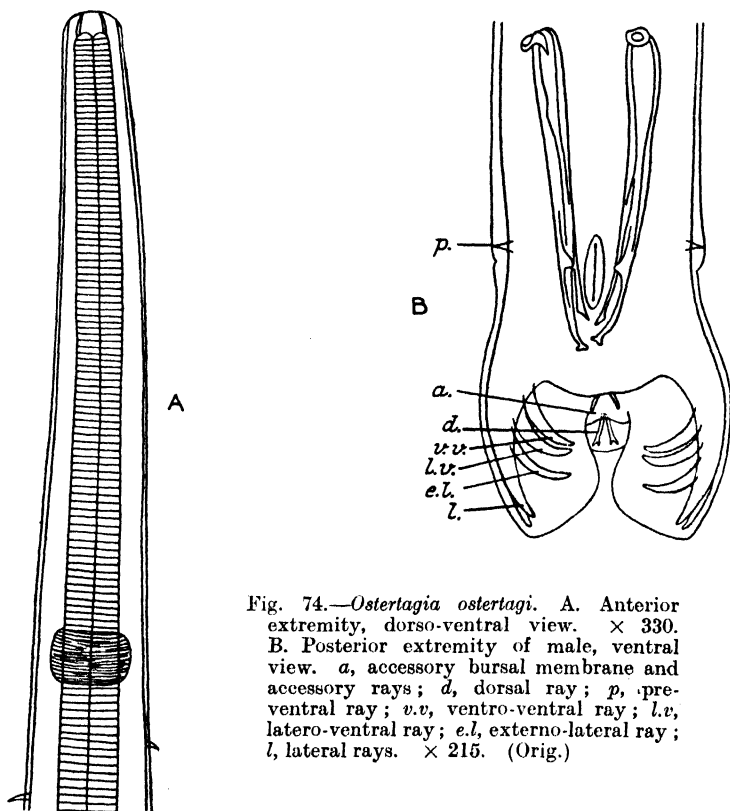


Fig. 74.—*Ostertagia ostertagi*. A. Anterior extremity, dorso-ventral view.  $\times 330$ . B. Posterior extremity of male, ventral view. *a*, accessory bursal membrane and accessory rays; *d*, dorsal ray; *p*, pre-ventral ray; *v.v*, ventro-ventral ray; *l.v*, latero-ventral ray; *e.l*, externo-lateral ray; *l*, lateral rays.  $\times 215$ . (Orig.)

externo-dorsal arises separately from the dorsal, dorsal bifurcate distally, each branch giving off one or two short lateral branches; within the bursa, towards its dorsal surface, there is an accessory bursal membrane with the free posterior edge supported by two slender diverging rays; spicules short, equal and ending in two or three processes; gubernaculum present or absent; prebursal papillæ present. Female: vulva in the posterior fifth of the worm. Oviparous. Parasites of mammals.

Type species: *O. ostertagi* (Stiles, 1892). ♂ 6.5–7.5 mm., ♀ 8.3–9.2 mm. In cattle and sheep (in nodules in stomach and also free in stomach).

Syn., *Strongylus ostertagi* Stiles, 1892.

*Strongylus convolutus* Ostertag, 1890.

*Strongylus cervicornis* McFadyean, 1897, in part.

*Strongylus harkeri* Stödter, 1901, in part.

Other species:

*O. asymmetrica* Ware, 1925. In *Cervus dama*.

*O. bisonis* Chapin, 1925. In *Bison bison*.

*O. brigantiaca* Blanchard, 1909. In the chamois.

*O. bullosa* Ransom and Hall, 1912. In *Ovis aries*.

*O. callis* (Travassos, 1914). In *Didelphys aurita*.

*O. circumcincta* (Stadelmann, 1894). In sheep, goat, and antelope.

Syn., *Strongylus vicarius* Stadelmann, 1894.

*Strongylus cervicornis* McFadyean, 1897, in part.

*O. marshalli* Ransom, 1907. In sheep.

*O. mentulata* Railliet and Henry, 1909. In camels.

*O. occidentalis* Ransom, 1907. In sheep.

*O. tricuspis* Marotel, 1912. In sheep.

*O. trifida* Cuillé, Marotel, and Panisset, 1911. In sheep.

*O. trifurcata* Ransom, 1907. In sheep and goat.

Refs. 59, 93b, 344a, 455, 458, 592a, 642, 663a.

Genus **MOLINEUS** Cameron, 1923.

*Definition.*—**TRICHOSTRONGYLINÆ**: head enlarged owing to inflation of the cephalic cuticle, which is transversely striated, elsewhere the cuticle exhibits twelve to fourteen longitudinal striations; cervical papillæ absent. Male: bursa not distinctly divided into three lobes; with the following formula—ventro-ventral and latero-ventral rays about equal, long and parallel, but slightly separated distally, externo-lateral very short, medio-lateral and postero-lateral long and parallel, externo-dorsal arises from a common trunk with the dorsal and is very short, reaching only about half-way to the edge of the bursa, dorsal bifurcate, each branch being tridigitate; spicules short and slightly curved, the double points are directed posteriorly, the posterior point of each spicule is much the larger and seems to be formed of two smaller points fused together, the cephalic end of the spicules is broad and cup-shaped; gubernaculum an elongated oval in shape; pre-bursal papillæ absent. Female: vulva in the posterior fourth of the body; posterior extremity bluntly rounded and from it projects a terminal spine. Oviparous. Parasites of mammals.



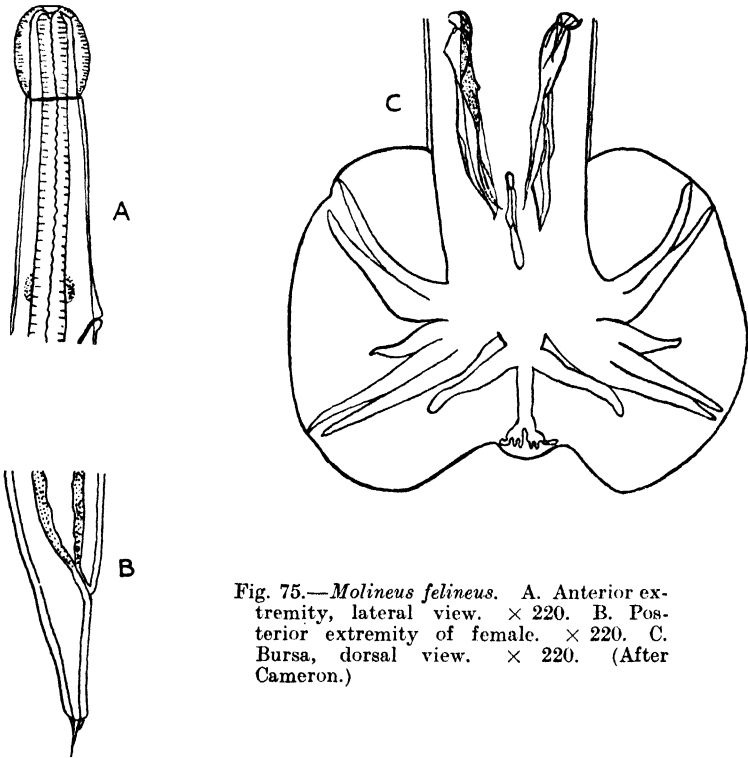


Fig. 75.—*Molineus felineus*. A. Anterior extremity, lateral view.  $\times 220$ . B. Posterior extremity of female.  $\times 220$ . C. Bursa, dorsal view.  $\times 220$ . (After Cameron.)

Type species : *M. felineus* Cameron, 1923. ♂ 4.75 mm., ♀ 5.25 mm. In *Felis yaguarundi*.

Other species :

*M. torulosus* (Molin, 1861). In *Cebus capucinus* and *Saimiris sciurea*.

Syn., *Strongylus torulosus* Molin, 1861.

*Oswaldocruzia wisei* Philpot, 1922.

*Trichostrongylus torulosus* (Molin, 1861) Trav., 1922.

Refs. 79, 360, 390.

#### Genus OSWALDOCRUZIA Travassos, 1917.

**Definition.**—TRICHOSTRONGYLINÆ : head relatively large, over  $50\ \mu$  in diameter, the cephalic cuticle being thickened and transversely striated. Male : bursa with the following formula—ventro-ventral and latero-ventral rays close together and approximately equal, externo-lateral isolated and of about the same length as the other rays, other laterals close together, externo-dorsal arises from the base of the dorsal, dorsal very thick and undivided except at its tip, where it ends in a number of digita-

tions; spicules end in a number of processes; gubernaculum absent. Female: vulva in posterior part of body. Parasites of reptiles and batrachians.

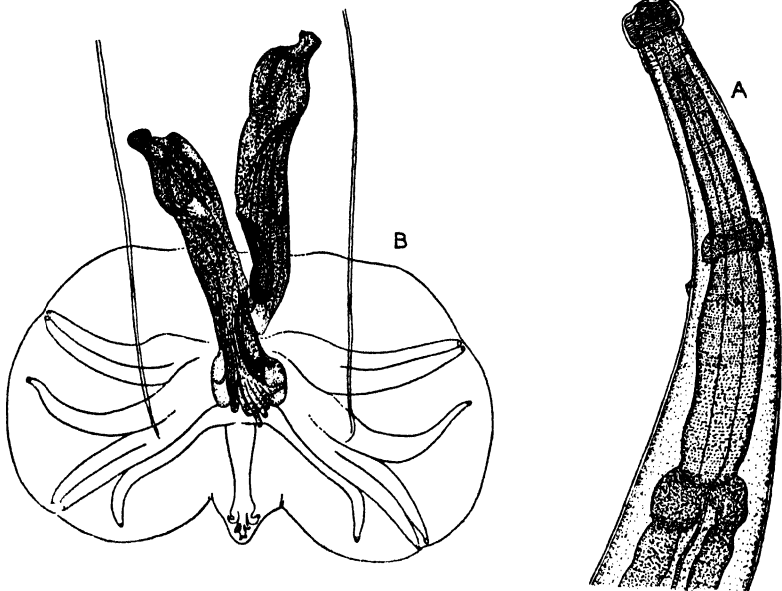


Fig. 76.—*Oswaldocruzia subauricularis*. A. Anterior extremity, lateral view.  $\times 120$ . B. Posterior extremity of male, dorsal view.  $\times 180$ . (After Travassos.)

Type species: *O. subauricularis* (Rudolphi, 1819). ♂ 6–7 mm., ♀ 10–11 mm. In *Bufo* spp., *Ceratophrys* sp.

Syn., *Strongylus subauricularis* Rud., 1819.

Other species:

*O. bialata* (Molin, 1861). In *Rana esculenta*.

*O. denudata* (Rud., 1819). In *Tropidonotus tessellatus*.

*O. dispar* (Duj., 1845). In *Anguis fragilis*.

*O. filiformis* (Goeze, 1782) Trav., 1917. In toads, frogs, lizards, etc.

Syn., *Strongylus auricularis* Zeder, 1800.

*O. leidy* Travassos, 1917. In *Cistudo carolina*.

Syn., *Strongylus auricularis* Leidy, 1856, not Zeder, 1800.

*O. subventricosa* (Schneider, 1866). In *Ceratophrys cornuta*.

Refs. 477, 630, 642.

Genus **ORNITHOSTRONGYLUS** Travassos, 1914.

Syn., *Cephaloststrongylus* Irwin-Smith, 1920.

**Definition.**—TRICHOSTRONGYLINÆ: cephalic cuticle inflated, buccal cavity with a reduced chitinous armature. Male: bursa

with large lateral lobes, dorsal lobe very small ; with the following formula—ventro-ventral and latero-ventral rays close together and about equal, externo-lateral close to medio-lateral proximally but diverging distally, medio-lateral and postero-lateral separated, externo-dorsal arises from the base of the dorsal, dorsal bifurcate and each branch bidigitate ; prebursal papillæ present ; spicules equal and end in three points ; gubernaculum (telamon ?) elongate

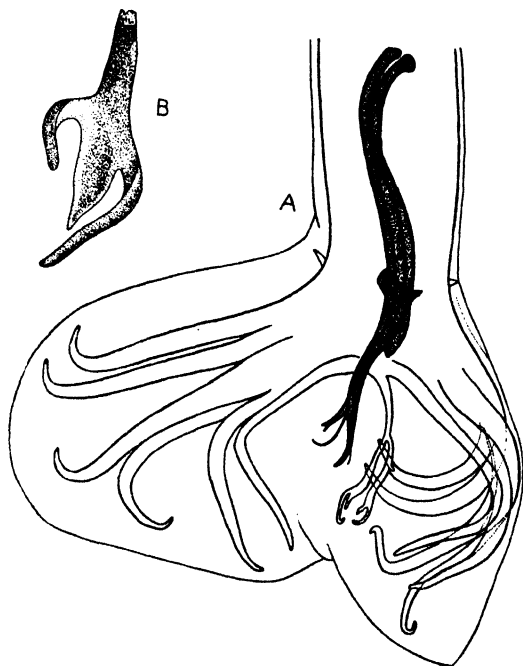


Fig. 77.—*Ornithostrongylus farii*. A. Posterior extremity of male.  $\times 190$ . (After Travassos.)  
*O. quadriradiatus*. B. Telamon.  $\times 470$ . (After Stephenson.)

with two lateral processes directed forwards almost forming a ring. Female : vulva in posterior half of body. Oviparous. Parasites of birds.

Type species : *O. farii* Travassos, 1914. ♂ 9–10 mm., ♀ 17–20 mm. In *Leptoptila rufaxila*.

Other species :

*O. hastatus* (Linstow, 1905). In *Lyrurus tetrix*.

? *O. papillatus* (Linstow, 1882). In *Otis tarda*.

*O. quadriradiatus* (Stevenson, 1904). In *Columba* sp.

Syn., *Strongylus quadriradiatus* Stevenson, 1904.

*Cephalostrongylus quadriradiatus* (Stevenson, 1904)

Irwin-Smith, 1920.

Refs. 207, 238, 623, 642.

Genus **OBELISCOIDES** Graybill, 1924.

Syn., *Obeliscus* Graybill, 1923, preoccupied.

*Definition*.—**TRICHOSTRONGYLINÆ**: mouth simple, buccal capsule absent, cervical papillæ present. Male: bursa with two large

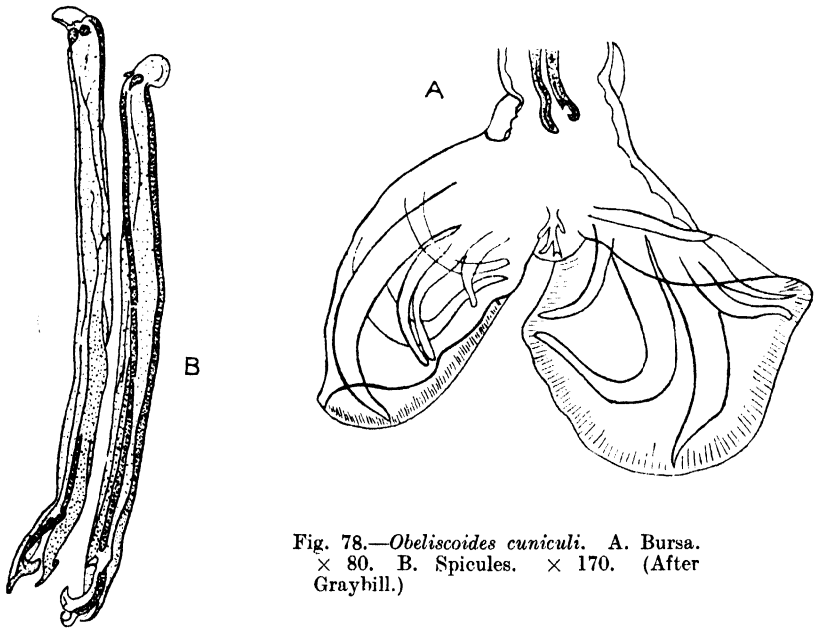


Fig. 78.—*Obeliscoides cuniculi*. A. Bursa.  $\times 80$ . B. Spicules.  $\times 170$ . (After Graybill.)

lateral lobes and a small well-defined dorsal lobe; with the following formula—ventro-ventral widely divergent from and much smaller than the latero-ventral ray, the two rays approximate, however, at their tips, externo-lateral large and separated from the other laterals, which are small and lie close together, externo-dorsal small and slightly curved, dorsal bifurcated, each limb being bidigitate, and from the common trunk is given off a lateral branch on each side; prebursal papillæ present; spicules fairly short, stout, cleft distally and ending in two barbed processes; gubernaculum absent. Female: vulva in posterior fourth of body. Oviparous. Parasites of rabbits.

Type species : *O. cuniculi* (Graybill, 1923). ♂ 10–14 mm., ♀ 15–18.5 mm. In rabbits.

Syn., *Obeliscus cuniculi* Graybill, 1923.

Refs. 201, 202.

Genus **TRAVASSOSIUS** Khalil, 1922.

*Definition.*—**TRICHOSTRONGYLINÆ** : slender worms slightly reddish in colour ; head about  $30\mu$  in diameter, mouth with three lips ; cuticle of head region transversely striated, elsewhere

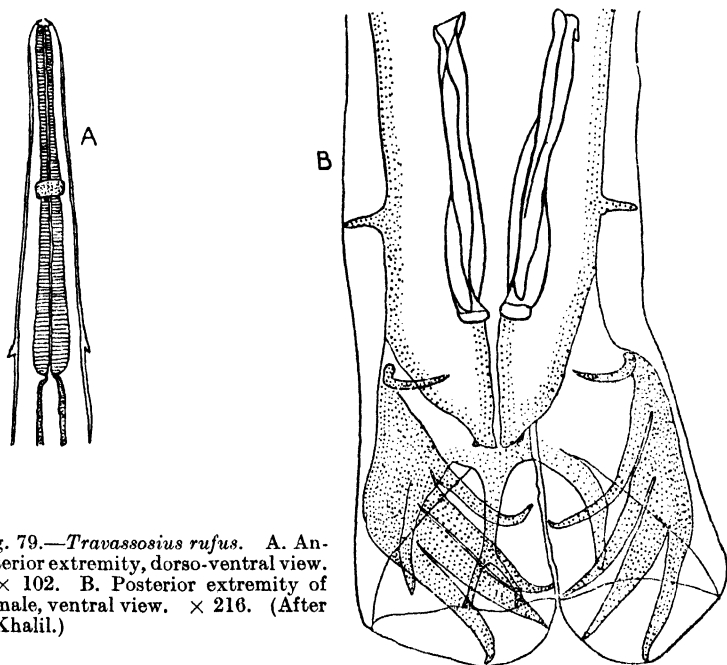


Fig. 79.—*Travassosius rufus*. A. Anterior extremity, dorso-ventral view.  $\times 102$ . B. Posterior extremity of male, ventral view.  $\times 216$ . (After Khalil.)

longitudinally striated ; cervical papillæ prominent. Male : bursa with large lateral lobes and with a small dorsal lobe ; with the following formula—ventro-ventral and latero-ventral rays widely separated, the ventro-ventral being much smaller than the latero-ventral, externo-lateral and the other laterals lie close together, externo-dorsal arises from the base of the dorsal, dorsal bifurcated in its distal third, each branch ending in two digitations ; spicules short and twisted with a knob-like caudal end ; gubernaculum absent ; prebursal papillæ large and conspicuous. Female : vulva in the posterior half of the body ; uteri divergent. Oviparous. Parasites of beavers,

Type species : *T. rufus* Khalil, 1922. ♂ 12 mm., ♀ 13 mm. In the beaver.

Other species : *T. americanus* Chapin, 1925. In *Castor canadensis*. Refs. 93b, 250.

Genus **COOPERIA** Ransom, 1907.

*Definition*.—**TRICHOSTRONGYLINÆ** : head relatively thick ( $25\ \mu$  or more in diameter), without well-marked lips or papillæ ; cuticle

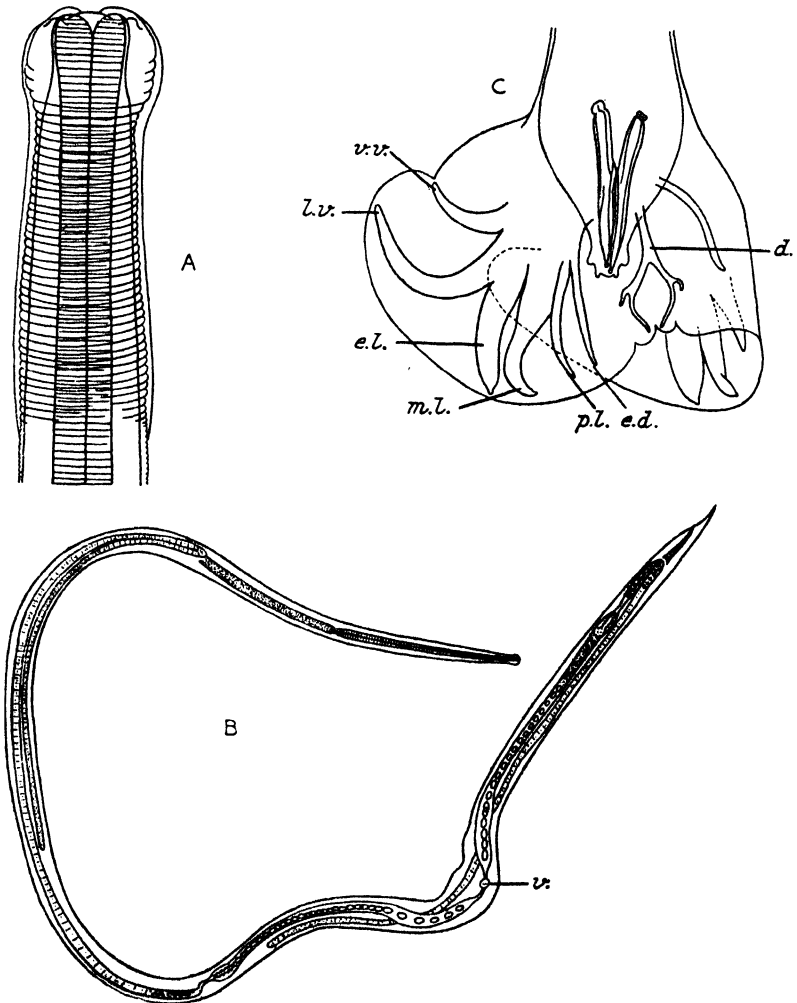


Fig. 80.—*Cooperia oncophora*. A. Anterior extremity, ventral view.  $\times 330$ . B. Female. v, vulva.  $\times 24$ . C. Bursa, dorso-lateral view. v.v, ventro-ventral ray; l.v, latero-ventral ray; e.l, externo-lateral ray; m.l, medio-lateral ray; p.l, postero-lateral ray; e.d, externo-dorsal ray; d, dorsal ray.  $\times 75$ . (Orig.)

of head region transversely striated and often dilated, giving the head a swollen or bulbous appearance, cuticle of remainder of body with fourteen to sixteen longitudinal ridges; buccal cavity small; cervical papillæ absent. Male: bursa with two large lateral lobes and a small dorsal lobe; with the following formula—ventro-ventral and latero-ventral rays widely separated, the ventro-ventral being much thinner and smaller than the latero-ventral, externo-lateral and other laterals separate, externo-dorsal arises from the base of the dorsal, dorsal ray divided about its mid-point into two branches, which together form a lyre- or horseshoe-shaped structure, from each branch near its origin a lateral twig is given off; spicules short with simple points; gubernaculum absent; prebursal papillæ absent. Female: vulva in the posterior fourth of the body. Oviparous. Parasites of mammals.

Type species: *C. curticei* (Railliet, 1893). ♂ 4.6–5.4 mm., ♀ 5.8–6.2 mm. In sheep and goat.

Syn., *Strongylus curticii* Giles, 1892.

*Strongylus ventricosus* Rud., 1809, of Curtice, 1890.

Other species:

*C. alata* Railliet and Henry, 1909. In monkeys.

*C. bisonis* Cram, 1925. In *Bison bison*.

*C. macieli* (Travassos, 1915). In *Tatus novemcinctus*.

*C. oncophora* (Railliet, 1898). In cattle and sheep.

Syn., *Strongylus ventricosus* Rud., 1809, in part.

*C. pectinata* Ransom, 1907. In cattle.

*C. punctata* (Linst., in Schnyder, 1907). In cattle.

Refs. 111c, 182, 419, 457, 458, 642.

#### Genus HISTIOSTRONGYLUS Molin, 1861.

*Definition*.—TRICHOSTRONGYLINÆ: anterior extremity dilated and with an umbellate membrane sustained by large spines (Molin), or thickened towards the periphery and having a spinous appearance under a low magnification (Travassos); mouth small and triangular. Male: bursa with large lateral lobes widely separated ventrally, and with a small dorsal lobe; with the following formula—ventro-ventral and latero-ventral rays widely separate and about equal, externo-lateral separated from the other lateral rays, externo-dorsal arises from the base of the dorsal, dorsal bifurcate for about half its length; spicules equal; gubernaculum present. Female: the posterior extremity ends in a spinous process, and there are two similar processes situated subventrally near the end of the body (Molin), but according to Travassos the posterior extremity of the female is provided with three strong spines, one dorsal and two subventral, between which the atrophied

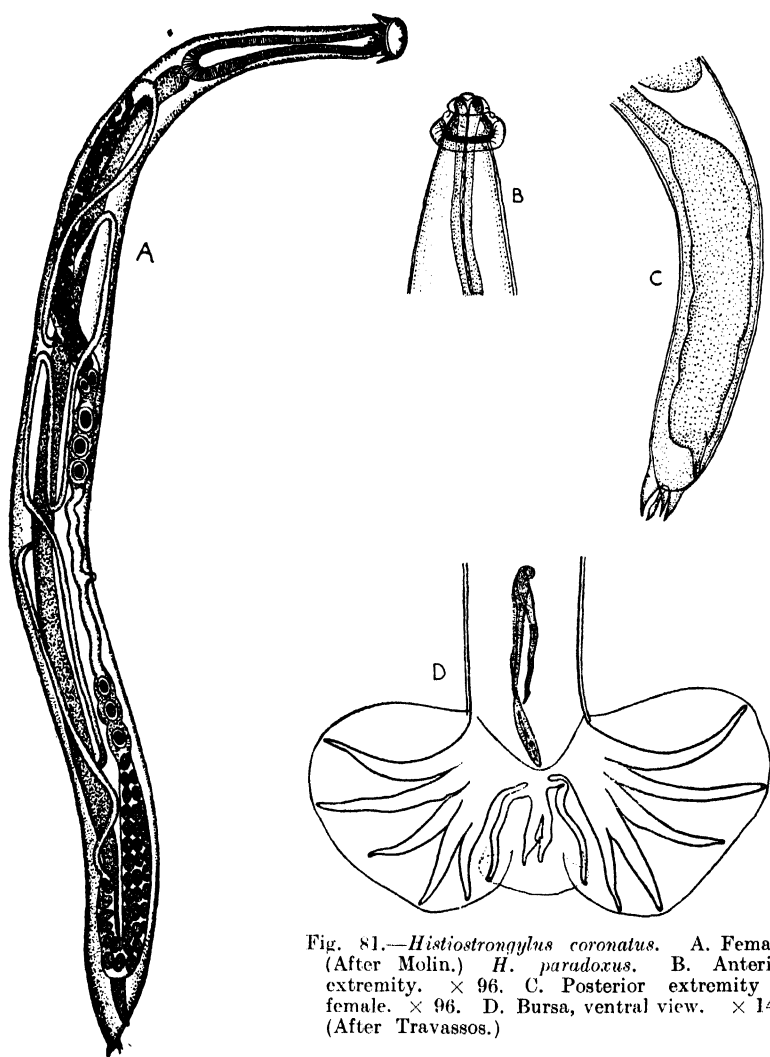


Fig. 81.—*Histioststrongylus coronatus*. A. Female. (After Molin.) *H. paradoxus*. B. Anterior extremity.  $\times 96$ . C. Posterior extremity of female.  $\times 96$ . D. Bursa, ventral view.  $\times 140$ . (After Travassos.)

tail is found ; vulva in the posterior part of the body. Parasites of Chiroptera.

Type species : *H. coronatus* Molin, 1861. ♂ 9 mm., ♀ 13 mm. In *Phyllostoma discolor*.

Other species :

*H. paradoxus* Travassos, 1918. In *Mollossidæ*.

*H. tipula* (v. Beneden, 1873). In bats.

Refs. 51, 360, 633, 642.



Genus **GRAPHIDIUM** Railliet and Henry, 1909.

*Definition.*—**TRICHOSTRONGYLINÆ**: head small; mouth relatively large; cuticle with numerous longitudinal striæ; cervical

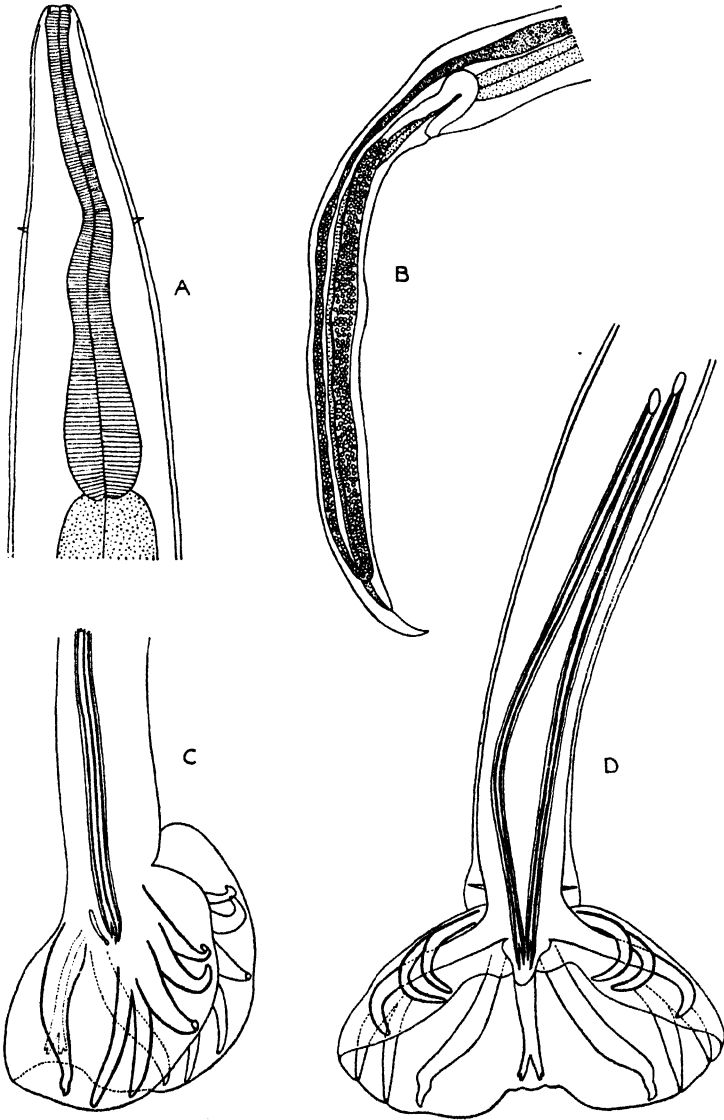


Fig. 82.—*Graphidium strigosum*. A. Anterior extremity, ventral view.  $\times 75$ . B. Posterior extremity of female, lateral view.  $\times 28$ . C. Bursa, semi-lateral view.  $\times 46$ . D. Bursa, ventral view.  $\times 46$ . (Orig.)

papillæ present. Male : bursa with well-developed lateral lobes and a small or indefinite dorsal lobe ; with the following formula—ventro-ventral and latero-ventral rays definitely separated, the ventro-ventral being smaller than the latero-ventral, the externo-lateral is about twice the thickness of the other rays, and is directed slightly anteriorly, medio-lateral and postero-lateral separate, externo-dorsal arises from a common trunk with the dorsal, dorsal bifurcate at the tip and each branch bidigitate ; spicules equal, long and filiform, each consisting of two chitinous rods joined by a membrane, the tips are multiple and very complicated ; gubernaculum colourless, but well-defined and situated close to the cloaca ; prebursal papillæ present. Female : vulva in the posterior third of the body, which narrows abruptly behind it. Oviparous. Parasites of the stomach and intestine of rodents.

Type species : *G. strigosum* (Dujardin, 1845). ♂ 8–16 mm., ♀ 11–20 mm. In *Lepus europæus*, etc.

Syn., *Strongylus strigosus* Duj., 1845.

*Strongylus retortæformis* Bremser, 1811, not Zeder, 1800.

*Spiroptera leporum* Moniez, 1880.

*Strongylus blasii* v. Linst., 1887.

Refs. 77, 79, 131, 205, 419, 642.

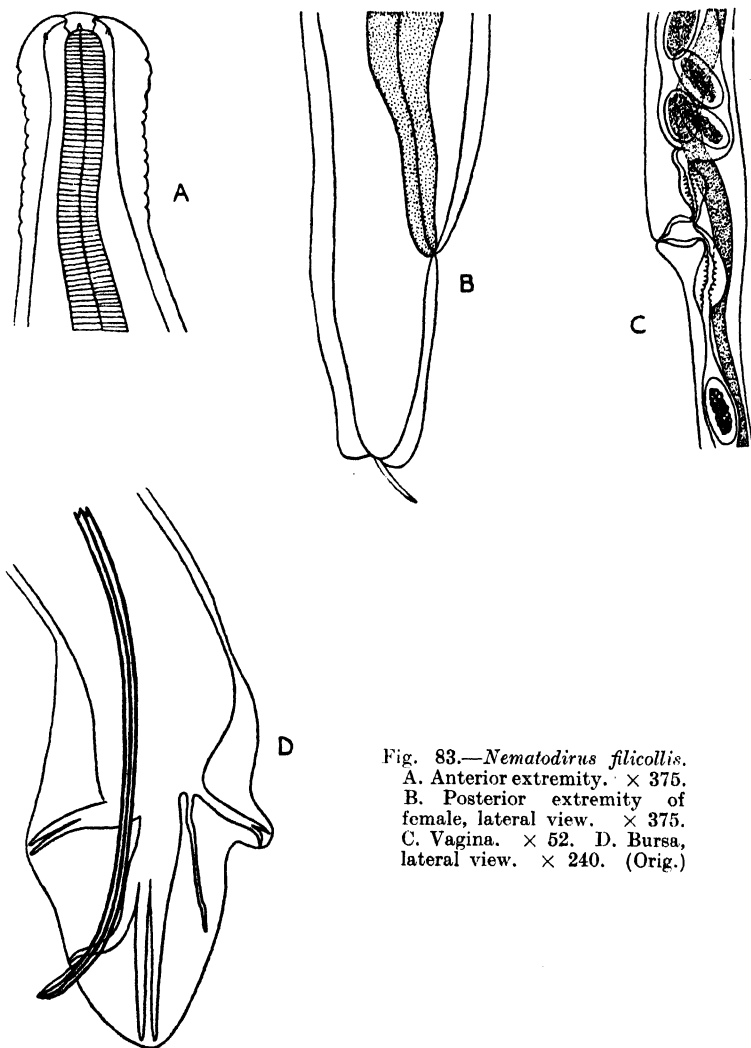
#### Genus NEMATODIRUS Ransom, 1907.

*Definition.*—TRICHOSTRONGYLINÆ : body capillary, attenuated anteriorly ; mouth simple surrounded by six papillæ ; cephalic cuticle dilated and transversely striated, body with eighteen distinct longitudinal striations ; cervical papillæ absent. Male : bursa with two large lateral lobes, dorsal lobe small or indefinite ; with the following formula—ventro-ventral and latero-ventral rays very close and parallel, externo-lateral separate from the other laterals, which are close together and parallel, externo-dorsal arises from the base of the dorsal ray, dorsal rays completely doubled with extremities bi- or tri-digitate ; spicules relatively large, filiform, and united by a membrane either throughout or only at their tips, which are simple ; gubernaculum absent. Female : vulva in the posterior third or fourth of the body ; tail conical and truncate, generally provided with a pointed process. Oviparous. Parasitic in the stomach and small intestine of mammals.

Type species : *N. filicollis* (Rudolphi, 1802). ♂ 10–15 mm., ♀ 15–20 mm. In sheep, goat, cattle, etc.

Syn., *Ascaris filicollis* Rud., 1802.

## Other species :

*N. abnormalis* May, 1920. In sheep and goats.*N. dromedarii* May, 1920. In dromedary.Fig. 83.—*Nematodirus filicollis*.A. Anterior extremity.  $\times 375$ .B. Posterior extremity of female, lateral view.  $\times 375$ .C. Vagina.  $\times 52$ . D. Bursa,lateral view.  $\times 240$ . (Orig.)*N. furcatus* May, 1920. In sheep.*N. helvetianus* May, 1920. In cattle.*N. hopkeni* Leiper, 1910. In hippopotamus.*N. leporis* Chandler, 1924. In domesticated rabbit.

- N. mauritanicus* Maupas and Seurat, 1912. In dromedary.  
*N. molini* (Railliet, 1898) Travassos, 1918. In *Tayassus* spp.  
*N. neotoma* Hall, 1916. In *Neotoma* sp.  
*N. roscidus* Railliet, 1911. In *Cervus* sp.  
*N. spathiger* (Railliet, 1896). In camel, sheep, cattle, goat, antelope, etc.  
*N. weinbergi* Railliet and Henry, 1909. In *Anthropopithecus troglodytes*.

Refs. 59, 60, 67, 90, 348, 350, 433, 455, 458, 642.

Genus **AUSTROSTRONGYLUS** Chandler, 1924.

*Definition*.—TRICHOSTRONGYLINÆ: body slender of nearly uniform diameter; cervical cuticle dilated and smooth; body with six or eight longitudinal ridges; mouth cavity relatively

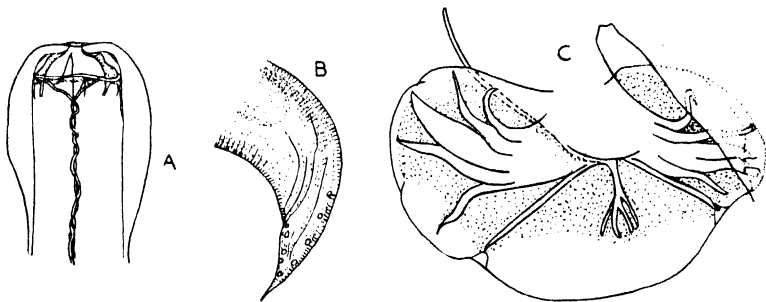


Fig. 84.—*Austrostrongylus macropodis*. A. Head.  $\times 330$ . B. Posterior extremity of female, lateral view.  $\times 130$ . C. Bursa.  $\times 130$ . (After Chandler.)

conspicuous and chitinized, with a relatively large dorsal tooth in its depth, and a smaller perforated ventral tooth. Male: bursa with large lateral lobes, the left lobe being smaller than the right; ventro-ventral and latero-ventral rays widely separate and of almost equal size, externo-lateral close to the medio-lateral, medio-lateral and postero-lateral widely divergent; on the right side the externo-lateral is much broader than the other lateral rays, whereas on the left side it is of about the same size as the other lateral rays; the externo-dorsal arises from the root of the dorsal ray and is longer on the right side than on the left, dorsal bifurcate in about its distal third, and a lateral branch is given off on each side just above the point of bifurcation; spicules slender with single points and apparently united by a membrane; gubernaculum present. Female: posterior extremity tapers rapidly behind the anus to end in a fine point; vulva some distance in front of the anus. Oviparous. Parasites of marsupials.

Type species : *A. macropodis* Chandler, 1924. ♂ 4.5–5 mm.,  
 ♀ 6.4–9.5 mm. In *Macropus bennetti*.  
 Ref. 88.

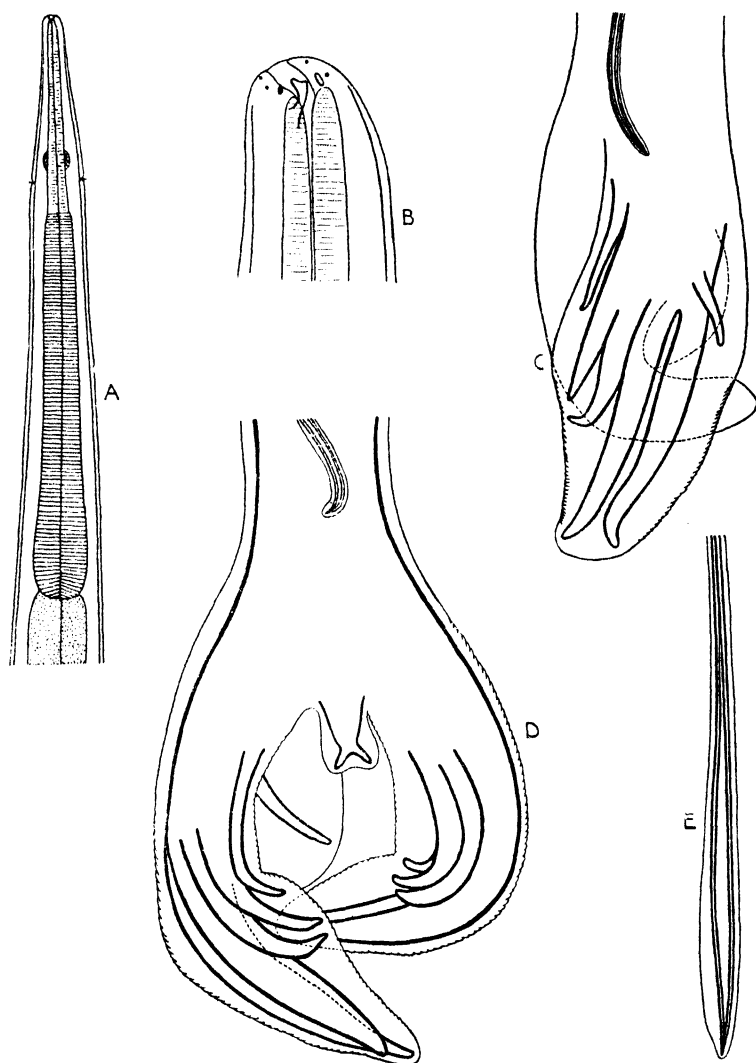


Fig. 85.—*Mecistocirrus digitatus*. A. Anterior extremity, ventral view.  $\times 46$ .  
 B. Head, lateral view, showing tooth.  $\times 330$ . C. Bursa, lateral view.  
 $\times 46$ . D. Bursa, dorsal view.  $\times 46$ . E. Ends of spicules.  $\times 215$ . (Orig.)

Genus **MECISTOCIRRUS** (Railliet and Henry, 1912) Neveu-Lemaire, 1914.

*Definition*.—**TRICHOSTRONGYLINÆ** : body attenuated anteriorly,  
 head small with six small papillæ, mouth subterminal opening

slightly dorsally, with a large buccal tooth; cuticle with fine transverse striations and about thirty longitudinal striæ; cervical papillæ present. Male: bursa with two large lateral lobes, and a small symmetrical dorsal lobe; with the following formula—ventro-ventral and latero-ventral rays widely separate, the ventro-ventral being much smaller than the latero-ventral, which is very large, externo-lateral as large as the latero-ventral and close to it, these two being far larger than any of the other rays, medio-lateral and postero-lateral small and close together, externo-dorsal very slender and arises separately from the dorsal, dorsal short and bifurcated, each division ending in three papillæ; spicules very long, slender, and united for almost their entire length, tips simple; gubernaculum absent; prebursal papillæ present. Female: vulva close to the anus, tail conical. Oviparous.

Type species: *M. digitatus* (v. Linstow, 1906). ♂ 16–24 mm. ♀ 19–29 mm. In bovines, pig, sheep, and man.

Syn., *Strongylus digitatus* Linst., 1906.

*Strongylus fordii* Daniels, 1908.

*Strongylus gibsoni* Stephens, 1909.

*Nematodirus digitatus* (Linst.) Railliet and Henry, 1909.

*Mecistocirrus fordii* (Daniels) Neveu-Lemaire, 1914.

*Mecistocirrus tagumai* Morishita, 1922.

Refs. 79, 116, 284, 328, 350, 369, 433, 589, 642.

#### Genus **GRAPHIDIOIDES** Cameron, 1923.

*Definition*.—Resembling *Graphidium*, but differing in the following particulars—cervical papillæ absent, ventro-ventral and

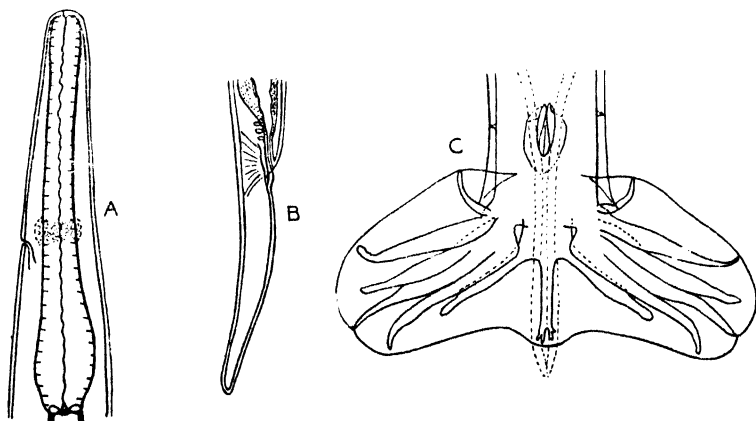


Fig. 86.—*Graphidioides affinis*. A. Anterior extremity, lateral view.  $\times 100$ . B. Posterior extremity of female, lateral view.  $\times 50$ . C. Bursa, dorsal view.  $\times 50$ . (After Cameron.)

latero-ventral rays of bursa widely divergent ; the ventro-ventral being much smaller than the latero-ventral ; spicules long and filiform, each consisting of two chitinized rods joined near their tips, which are simple, from the median side of each spicule project two membranes, which anastomose near the termination of the spicules, so that these are virtually joined together ; gubernaculum situated at some distance from the genital cone, it consists of a broad base with raised lateral ridges, and a double central keel. In the female the body narrows abruptly behind the anus instead of behind the vulva. Parasites of rodents.

Type species : *G. affinis* (Mégnin, 1895). ♂ 9–17 mm., ♀ 16–21 mm. In *Dolichotis magellanicus*.

Syn., *Strongylus affinis* Mégnin, 1895.

*Strongylus rectus* Linstow, 1906.

Other species :

*G. rudicaudatus* (Railliet and Henry, 1909). In *Viscacia viscacia*.

Syn., *Graphidium rudicaudatum* Railliet and Henry, 1909.

Refs. 79, 84a, 419, 642.

#### Genus NEMATODIRELLA n. g.

Syn., *Microcephalus* Romanovitch, 1915, preoccupied.

*Definition*.—TRICHOSTRONGYLINÆ: body attenuated anteriorly, the cephalic extremity vesicular and  $60\mu$  broad. Head with two large lateral and four smaller submedian papillæ, cuticle marked by about forty longitudinal striations. There is no buccal cavity, the mouth opening directly into the œsophagus. Male: small bilobed bursa ; with the following formula—ventro-ventral and latero-ventral rays small, externo-lateral large and arising from a common trunk with the other laterals ; spicules equal and very long, measuring nearly half the length of the worm. Female : anterior quarter of the body filiform, then suddenly enlarging, from which point it gradually attenuates towards the posterior extremity ; tail short and blunt ; vulva situated on an eminence at the end of the anterior fourth of the body. Oviparous.

Type species : *N. longispiculata* nom. nov. ♂ 20–25 mm., ♀ 45–50 mm. In *Tarandus rangifer*.

Syn., *Microcephalus longissime spiculatus* Romanovitch, 1915.

Ref. 471.

#### Subfamily HELIGMOSOMINÆ Travassos, 1914.

*Definition*.—TRICHOSTRONGYLIDÆ: buccal capsule absent or rudimentary ; female with single genitalia.

KEY TO GENERA.

1. Lateral lobes of bursa and rays  
markedly asymmetrical . . . Nippostrongylus, p. 147.  
Lateral lobes of bursa and rays  
approximately symmetrical . . . 2
2. Tail of female ends in three or  
more cusps ; vulva not close  
to anus . . . . . Ollulanus, p. 148.  
Tail of female not ending in  
three cusps ; vulva close to  
anus . . . . . 3
3. Body not coiled in a permanent  
spiral . . . . . 4  
Body coiled in a permanent spiral . . . . . 6
4. Dorsal ray completely doubled . . . Heligmostrongylus, p. 144.  
Dorsal ray only forked at its  
extremity . . . . . 5
5. Cervical cuticle studded with  
papillæ ; dorsal ray very large . . . Impalaia, p. 143.  
Cervical cuticle not studded with  
papillæ ; dorsal ray relatively  
small . . . . . Heligmosomum, p. 142.
6. Dorsal ray very short, not  
approaching bursal margin . . . 7  
Dorsal ray long, almost reaching  
bursal margin . . . . . 8
7. Dorsal ray divided only at its  
extremity ; prebursal papillæ  
present ; gubernaculum absent . . . Heligmosomoides, p. 146.  
Dorsal ray completely doubled ;  
prebursal papillæ absent ;  
gubernaculum present . . . . . Nematospira, p. 147.
8. Dorsal ray forked near its ex-  
tremity ; ventro-ventral and  
latero - ventral completely  
separate, as also are the medio-  
lateral and postero-lateral . . . Viannaia, p. 149.  
Dorsal ray split for more than  
half its length ; ventro-ventral  
and latero-ventral fused proxi-  
mally, as also are the medio-  
lateral and postero-lateral . . . Viannella, p. 150.



Genus **HELIGMOSOMUM** Railliet and Henry, 1909.

*Definition.*—**HELIGMOSOMINÆ**: body not spirally rolled; cuticle with marked transverse and longitudinal striations, of which some (the dorsal and sometimes the ventral) are very prominent, constituting true longitudinal alæ; cephalic cuticle inflated. Male: bursa well-developed; with the following formula—ventro-ventral and latero-ventral rays widely separate, about equal in size, and directed forward, externo-lateral, medio-lateral, and postero-lateral divergent and relatively large, externo-dorsal arising from a common trunk with the dorsal and very thin, dorsal ray small and ends in four branches, of which the two internal are bifid; spicules relatively long, thin and equal; gubernaculum absent or rudimentary. Female: vulva just in front of the anus. Parasites of the stomach and intestine of rodents and marsupials.



Fig. 87. — *Heligmosomum braziliense*. Posterior extremity of male.  $\times 85$ . (After Travassos.)

Type species: *H. costellatum* (Dujardin, 1845). ♂ 11 mm., ♀ 17 mm. In *Microtus arvalis*.

Syn., *Strongylus costellatus* Duj., 1845.

Other species:

*H. aculeatum* Travassos, 1917. In *Muridæ*.

*H. agoutii* Neiva, Cunha, and Travassos, 1914. In *Dasyprocta agouti*.

*H. alpha* Travassos, 1918. In *Muridæ*.

*H. beta* Travassos, 1918. In *Muridæ*.

*H. braziliense* Travassos, 1914. In *Mus* sp.

*H. cristatum* Gedoelst, 1917. In *Sciurus prevosti*.

*H. delta* Travassos, 1918. In *Muridæ*.

*H. didelphe* (Travassos, 1914). In *Didelphys* sp.

*H. elegans* Travassos, 1921. In *Cændu villosus*.

*H. gamma* Travassos, 1918. In *Mesomys guira*.

*H. gracile* (Leuckart, 1842). In *Myoxus glis*.

*H. læve* (Duj., 1845). In *Dipodilla* sp., *Pitymys* sp., *Apodemus* sp.

*H. minutum* (Duj., 1845). In *Microtus* sp., etc.

*H. nematodiriformis* Travassos, 1918. In *Muridæ*.

*H. vexillatum* Hall, 1916. In *Thomomys fessor*.

Refs. 131, 152, 205, 368, 419, 524a, 623, 642.

Genus **IMPALAIA** Monnig, 1924.

*Definition.*—**HELIGMOSOMINÆ**: body filiform, not spirally rolled, cuticle with well-marked longitudinal striations, cephalic

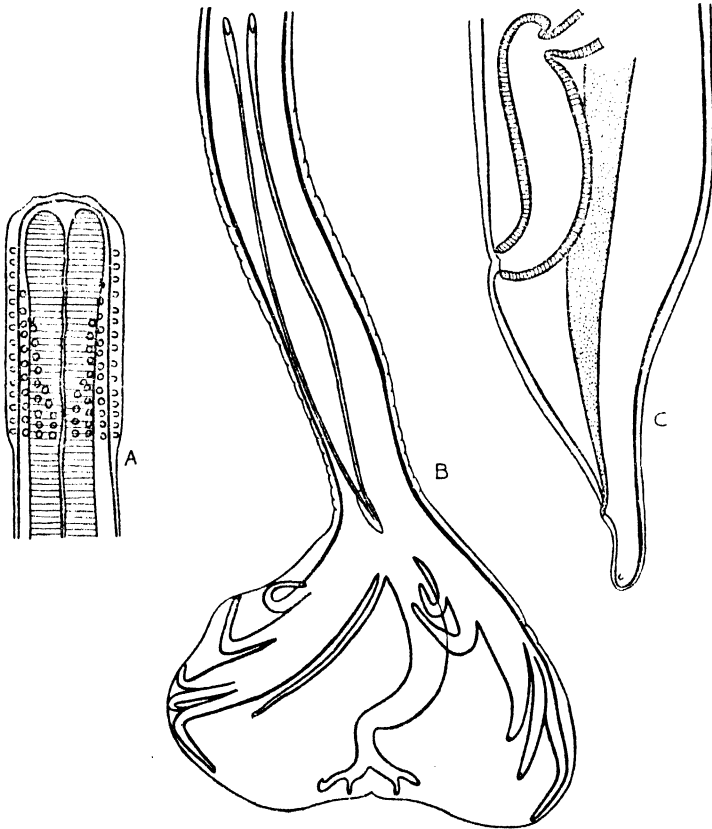


Fig. 88.—*Impalaia tuberculata*. A. Anterior extremity.  $\times 330$ . B. Posterior extremity of male, dorsal view.  $\times 215$ . C. Posterior extremity of female, lateral view.  $\times 76$ . (Orig.)

and cervical cuticle slightly inflated, and cervical cuticle studded with small papillæ. Male: bursa with well-developed lateral lobes, and having the following formula—ventro-ventral and latero-ventral rays separate and directed forwards, externo-lateral and laterals arise from a common trunk, the postero-lateral being directed posteriorly and much longer than the medio-lateral,

externo-dorsal arises from the base of the dorsal ray and is long and thin, dorsal ray very large and thick proximally, tapering distally, and bifurcate near its extremity, each branch being bidigitate; spicules long and filiform; gubernaculum present. Female: tail narrows abruptly behind the vulva and ends in a short conical process; anus near the tip of the tail.

Type species: *I. tuberculata* Monnig, 1924. ♂ 8 mm., ♀ 17 mm. In *Aepyceros melampus*.

Refs. 362, 363.

Genus **HELIGMOSTRONGYLUS** Travassos, 1917.

*Definition.*—**HELIGMOSOMINÆ**: body filiform, not spirally rolled; cuticle with fine transverse striations and marked longitudinal

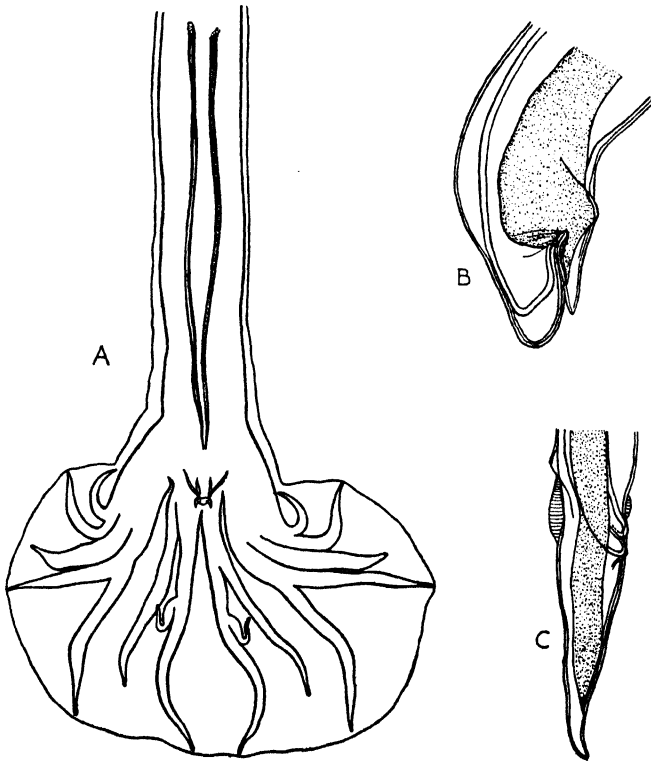


Fig. 89.—*Heligmostrongylus sedecimradiatus*. A. Posterior extremity of male, dorsal view.  $\times 90$ . B. Posterior extremity of old female.  $\times 150$ . C. Posterior extremity of young female.  $\times 150$ . (After Travassos.)

striations, of which the dorsal is in the form of a flange extending from the cephalic cuticular dilatation almost to the posterior

extremity. Male: bursa well-developed; with the following formula—ventro-ventral and latero-ventral rays united in their proximal third, the distal portions being widely separate and directed forwards, medio-lateral and postero-lateral united in their proximal third and widely separated distally, the dorsal is completely doubled and very long, each branch giving off near its base the externo-dorsal, and further down a short lateral branch; spicules long and delicate; gubernaculum consists of a central piece with a number of branches. Female: vulva near anus, and almost always with a ventral process, which may extend even as far as the end of the tail. Parasites of rodents.

Type species: *H. sedecimradiatus* (Linst., 1899). ♂ 8–10 mm., ♀ 14–16 mm. In *Agouti paca*.

Syn., *Strongylus sedecimradiatus* Linstow, 1899.

Refs. 318, 628, 642.

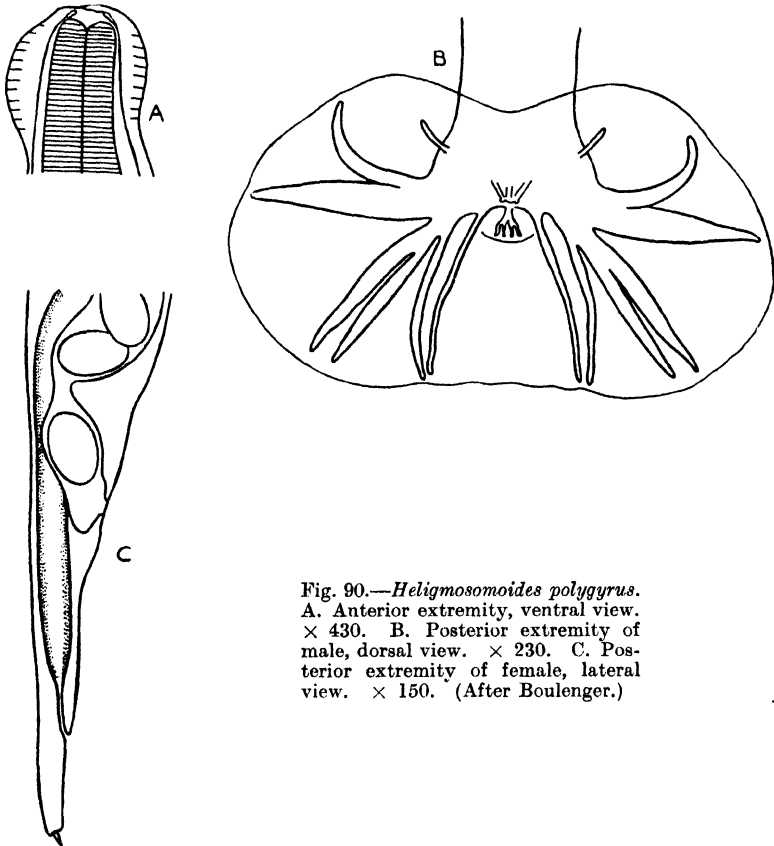


Fig. 90.—*Heligmosomoides polygyrus*.  
A. Anterior extremity, ventral view.  $\times 430$ . B. Posterior extremity of male, dorsal view.  $\times 230$ . C. Posterior extremity of female, lateral view.  $\times 150$ . (After Boulenger.)

Genus **HELIGMOSOMOIDES** Hall, 1916.

*Definition.*—**HELIGMOSOMINÆ**: body spirally rolled, head small; cephalic cuticle inflated, usually asymmetrically developed and showing transverse striations; the rest of the body covered by faint transverse striations, and numerous distinct longitudinal ridges separated by similar fine striations; cervical papillæ absent or minute. Male: bursa well-developed indistinctly trilobed, with the following formula—ventro-ventral and latero-ventral rays widely separate and divergent, externo-lateral and lateral rays arising from a common trunk and clearly separated, externo-dorsal long, slender, and arises separately from the dorsal, dorsal slender, very short, and dividing into four branches; prebursal papillæ well-developed; spicules simple and filiform; gubernaculum absent. Female: posterior extremity conical and ending in a pointed spike; vulva close to anus; ovejector well-developed

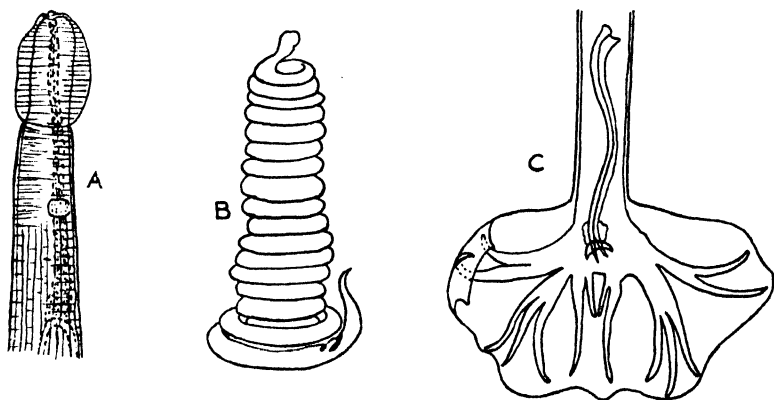


Fig. 91.—*Nematospira turgida*. A. Anterior extremity.  $\times 115$ . B. Female.  $\times 17$ . C. Posterior extremity of male, ventral view.  $\times 85$ . (After Walton.)

and muscular. Oviparous, eggs small and oval, shells thin and rugose. Parasites of rodents.

Type species: *H. polygyrus* (Duj., 1845). ♂ 4–5.3 mm., ♀ 6–10 mm. In *Microtus arvalis*.

Syn., *Strongylus polygyrus* Duj., 1845.

*Heligmosomum polygyrum* (Duj., 1845) Railliet and Henry, 1909.

*Viannaia polygyra* (Duj., 1845) Hall, 1916.

*Heligmosomoides linstowi* Hall, 1916.

Refs. 70, 131, 205, 312, 642

Genus **NEMATOSPIRA** Walton, 1923.

*Definition.*—**HELIGMOSOMINÆ**: closely resembling *Heligmosomoides*, but differing in the absence of prebursal papillæ, the presence of a gubernaculum, and the fact that the dorsal ray is completely doubled. Parasites of rodents.

Type species: *N. turgida* Walton, 1923. ♂ 4–6 mm., ♀ 12–15 mm. In *Microtus arvalis*.

Ref. 659.

Genus **NIPPOSTRONGYLUS** Lane, 1923.

*Definition.*—**HELIGMOSOMINÆ**: very delicate worms, mouth simple; with a small oral cavity; head small with the cephalic cuticle slightly inflated. Male: bursa markedly asymmetrical, large and somewhat inrolled; with the following formula—the

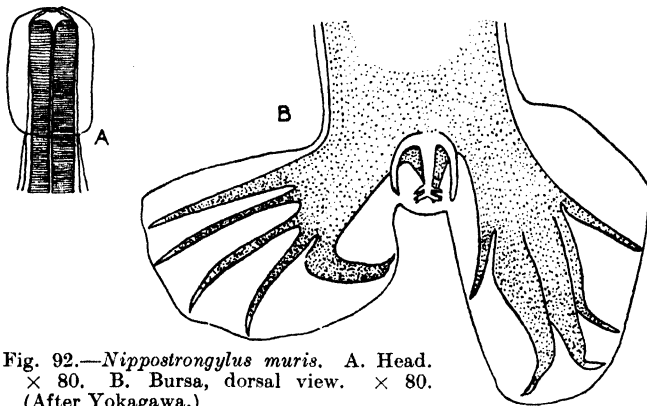


Fig. 92.—*Nippostrongylus muris*. A. Head.  $\times 80$ . B. Bursa, dorsal view.  $\times 80$ . (After Yokagawa.)

rays of the left side differ greatly from those of the right side; on the left side the ventro-ventral and latero-ventral rays are parallel, long and thin, the externo-lateral and the medio-lateral are also long and thin, whilst the postero-lateral is thick, and towards its extremity curves dorsally to end in a conical tip; on the right side the ventro-ventral is delicate and widely separated from the latero-ventral, which is also thin, but lies close to the externo-lateral except at its tip, the externo-lateral and medio-lateral are thick and lie close together, but diverge at their extremities, the postero-lateral is small and delicate; the externo-dorsal may arise at slightly different levels from a common trunk with the dorsal, dorsal bifurcate near its tip, each limb ending in two or three digitations; spicules equal, long and filiform

with sickle-shaped extremities ; gubernaculum present. Female : vulva close to the anus. Oviparous. Parasites of rodents.

Type species : *N. muris* (Yokogawa, 1920). ♂ 3–4 mm., ♀ 4–6 mm. In rats.

Syn., *Heligmosomum muris* Yokogawa, 1920.

Refs. 268, 668.

Genus **OLLULANUS** Leuckart, 1865.

*Definition*.—**HELIGMOSOMINÆ** : minute worms, generally found with the head coiled on itself ; buccal cavity small without teeth, cutting plates or similar structures ; the cavity is formed by a reflection of the cuticle and in optical section is almost spherical ; œsophagus only slightly swollen posteriorly ; cervical papillæ

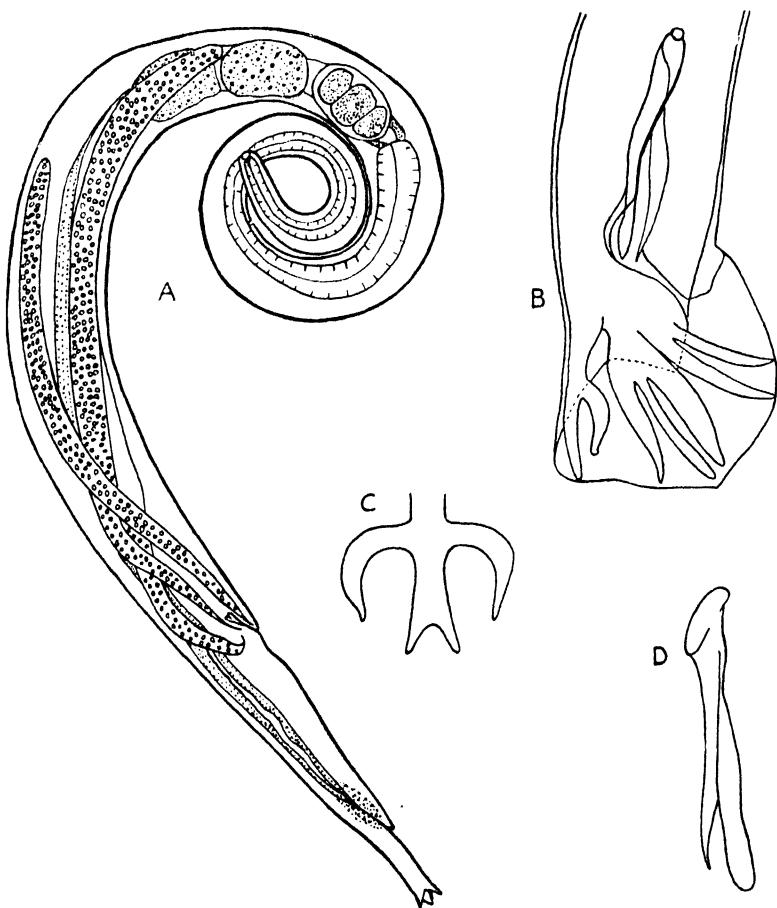


Fig. 93.—*Ollulanus tricuspis*. A. Female.  $\times 288$ . B. Posterior extremity of male.  $\times 600$ . C. Dorsal ray of bursa.  $\times 880$ . D. Spicule.  $\times 800$ . (After Cameron.)

large and situated at the posterior portion of the œsophagus. Male: bursa undivided and open only on the ventral surface; with the following formula—ventro-ventral and latero-ventral rays separate and about the same size, externo-lateral thick and arises from a common trunk with the laterals, externo-dorsal arises from a common trunk with the dorsals, dorsal thick and bifurcated near the tip; prebursal rays absent; spicules equal, short, and bifurcated, one limb being sharp and the other rounded; gubernaculum absent. Female: the posterior extremity ends typically in three cusps, but occasionally one or two small extra cusps may be present; vulva prominent, situated about the beginning of the posterior fifth of the worm; vagina short; uterus single; ovary single. Oviparous, the eggs being large and granular. Parasites of cats.

Type species: *O. tricuspis* Leuckart, 1865. ♂ 0.7–0.8 mm., ♀ 0.8–1 mm. In cats.

Refs. 81, 205, 299, 405.

**Genus VIANNAIA Travassos, 1914.**

*Definition.*—**HELIGMOSOMINÆ**: body spirally coiled; cuticle with slight transverse striations, but without longitudinal striations, and enormously thickened, especially in the male; cephalic cuticle inflated. Male: bursa with lateral lobes generally slightly unequal; with the following

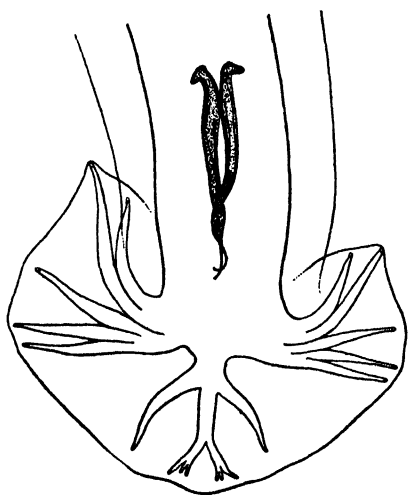


Fig. 94.—*Viannaia viannai*. Posterior extremity of male, dorsal view.  $\times 270$ . (After Travassos.)

formula—ventro-ventral and latero-ventral rays separated slightly and directed forwards, externo-lateral and laterals separate, externo-dorsal arises from a common trunk with the dorsals, dorsal bifurcated near its extremity, the branches may be digitate; spicules short, about equal; gubernaculum, when present, is indistinct. Female: vulva near the anus. Parasites in intestine of marsupials, edentata, insectivora, and rodents.

Type species: *V. viannai* Travassos, 1914. In *Didelphys aurita*. ♂ 3.2 mm., ♀ 5.2 mm.

Other species:

*V. conspicua* Travassos, 1914. In *Didelphys opossum*.

*V. depressa* (Duj., 1845). In *Sorex* spp. and *Crocidura* sp.



*V. hamata* Travassos, 1914. In *Didelphys aurita*.

*V. linstowi* Travassos, 1918. In *Talpa europæa*.

*V. minuscula* Travassos, 1915. In *Tamandua* sp. and *Myrmecophaga* sp.

*V. pudica* Travassos, 1921. In *Dasyprocta agouti*.

*V. pusilla* Travassos, 1914. In *Didelphys aurita*.

*V. saimiris* Cameron, 1923. In *Saimiris sciurea*.

Refs. 79, 131, 205, 623, 642.

Genus **VIANNELLA** Travassos, 1918.

*Definition*.—**HELIGMOSOMINÆ**: closely resembles *Viannaia* except in the following points—ventro-ventral and latero-ventral rays fused proximally and diverging distally, medio-lateral and

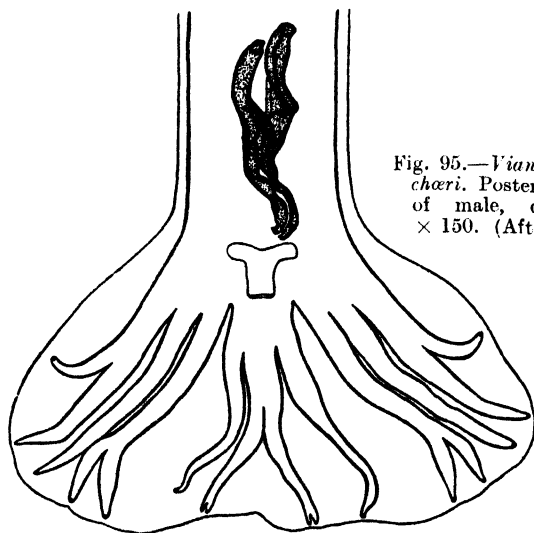


Fig. 95.—*Viannella hydrochæri*. Posterior extremity of male, dorsal view.  $\times 150$ . (After Travassos.)

postero-lateral fused proximally and diverging distally, dorsal bifurcated for more than half its length. Parasites of small intestine of rodents.

Type species: *V. hydrochæri* (Travassos, 1914). ♂ 1.9 mm., ♀ 2.3–2.4 mm. In *Hydrochærus capibara*.

Syn., *Viannaia hydrochæri* Travassos, 1914.

Other species: *V. fariai* (Travassos, 1915). In *Silvilagus brasiliensis*.

*V. viscaciæ* Goodey, 1925. In *Viscacia viscacia*.

Refs. 195b, 205, 623, 633, 642.

**TRICHOSTRONGYLIDÆ incompletely known.**Genus **WARRENIUS** Hall, 1918.

*Definition.*—TRICHOSTRONGYLIDÆ: subfamily? Cuticle of head inflated; a unilateral cervical wing present. Male: bursa with two large lateral lobes and a small but distinct dorsal lobe; with the following formula—ventro-ventral and latero-ventral rays fused proximally diverging distally, externo-lateral arises from a

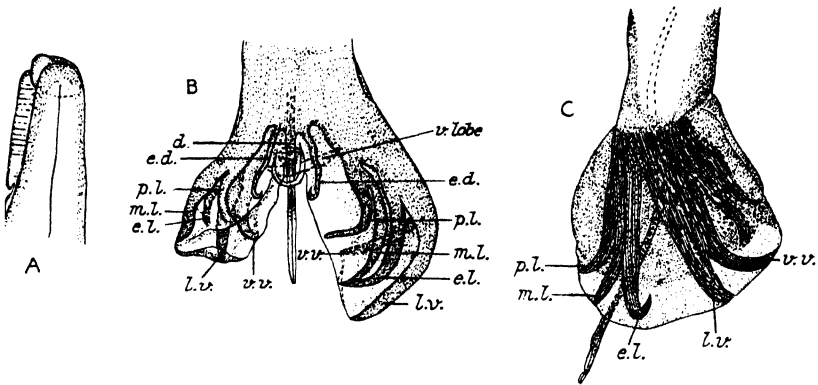


Fig. 96.—*Warrenius quadrivittati*. A. Head.  $\times 200$ . B. Bursa, dorsal view. *d*, dorsal ray; *e.d*, externo-dorsal ray; *p.l*, postero-lateral ray; *m.l*, medio-lateral ray; *e.l*, externo-lateral ray; *l.v*, latero-ventral ray; *v.v*, ventro-ventral ray; *v.lobe*, ventral lobe of bursa. C. Bursa, lateral view. (After Hall.)

common trunk with the other laterals, medio-lateral and postero-lateral fused proximally, externo-dorsal is long and wavy, dorsal bifurcates near its extremity, each branch gives off a short lateral twig; spicules long and narrow. Female: unknown.

Type species: *W. quadrivittati* Hall, 1918. ♂ 6.2 mm., ♀? In *Eutamias quadrivittatus*.

Other species: \* *W. bifurcatus* Sleggs, 1925. In *Citellus richardsonii*.

Refs. 205, 582b, 642.

Genus **CITELLINEMA** Hall, 1916.

*Definition.*—TRICHOSTRONGYLIDÆ: subfamily? Head surrounded by a collar which forms the external limit of a depression around the head anteriorly. Male: bursa with two large lateral lobes; with the following formula—ventro-ventral, latero-ventral, and externo-lateral rays arise from a common trunk, medio-lateral and postero-lateral separate, dorsal not distinguishable in the one specimen available; spicules bifurcate for nearly their whole length. Female: unknown.

\* As this species has double female genitalia, the genus belongs to the *Trichostrongylinae*.

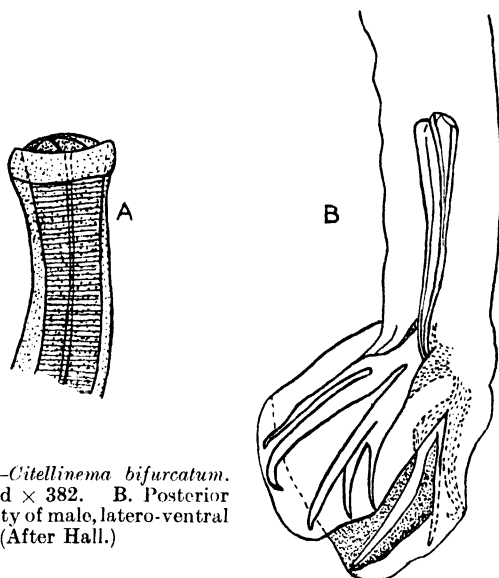


Fig. 97.—*Citellinema bifurcatum*.  
A. Head  $\times 382$ . B. Posterior  
extremity of male, latero-ventral  
view. (After Hall.)

Type species: *C. bifurcatum* Hall, 1916. ♂ 6.8 mm., ♀ ? In *Citellus elegans*.

Refs. 205, 642.

#### Subfamily AMIDOSTOMINÆ Travassos, 1919.

*Definition*.—TRICHOSTRONGYLIDÆ: with buccal capsule relatively well-developed, but without a corona radiata or anterior cutting organs. Spicules short and divided distally into two or three processes. Female with double genitalia.

#### KEY TO GENERA.

1. Buccal capsule without teeth in its depth, head with prominent posteriorly directed papillæ . . . . . *Epomidiostomum*, p. 155.  
   Buccal capsule with a pointed tooth or teeth in its depth, head without posteriorly directed papillæ . . . . . 2
2. Ventro-ventral and latero-ventral rays widely separated; medio-lateral and postero-lateral separate . . . . . *Amidostomum*, p. 153.  
   Ventro-ventral and latero-ventral rays close together; medio-lateral and postero-lateral fused proximally . . . . . *Amphibiophilus*, p. 154.

Genus **AMIDOSTOMUM** Railliet and Henry, 1909.

*Definition.*—**AMIDOSTOMINÆ**: mouth directed straight forwards; buccal capsule subglobular, furnished in its depth with a sharp tooth or teeth; œsophagus presenting in its lumen three axial chitinous plates extending practically its whole length. Male: lateral lobes of bursa much longer than the dorsal lobe; with the following formula—ventro-ventral and latero-ventral rays widely

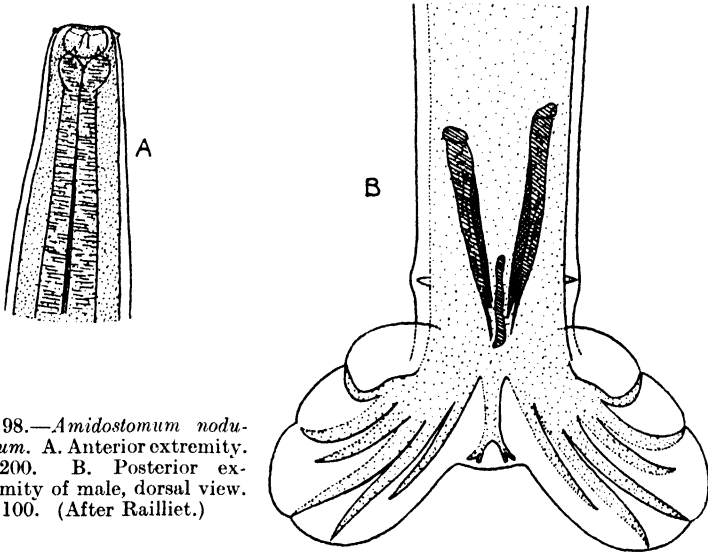


Fig. 98.—*Amidostomum nodulosum*. A. Anterior extremity.  $\times 200$ . B. Posterior extremity of male, dorsal view.  $\times 100$ . (After Railliet.)

separate, externo-lateral, medio-lateral and postero-lateral separate, externo-dorsal arises separately from the dorsal, is short, and does not reach the bursal margin, dorsal ray bifurcated near its extremity, each branch being bidigitate; spicules equal, each divided for more than half its length; gubernaculum present. Female: vulva in the posterior fifth of the body; tail digitiform. Parasites of the gizzard of birds.

Type species: *A. nodulosum* (Rud., 1803). ♂ 10–17 mm., ♀ 12–24 mm. In *Anser domestica*.

Syn., *Strongylus nodulosus* Rud., 1803.

*Strongylus nodularis* Rud., 1809.

*Strongylus anseris* Zed., 1800, in part.

? *Strongylus acutus* Lundahl, 1848.

*Ascaris mucronata* Froel., 1791, not Schrank, 1780.

*Strongylus mucronatus* (Froel., 1791) Railliet, 1893.

*Strongylus monodon* Linstow, 1882.

*Amidostomum anseris* (Zeder, 1800) Railliet and Henry, 1909, in part.

Other species :

*A. chevreuxi* Seurat, 1918. In *Himantopus himantopus*.

*A. fulicæ* (Rud., 1819). In *Fulica atra*.

*A. henryi* Skrjabin, 1915. In *Vanellus cristatus*.

*A. raillieti* Skrjabin, 1915. In *Fulica atra*.

Refs. 150, 398, 420, 476, 550, 551, 572, 636, 681.

Genus **AMPHIBIOPHILUS** Skrjabin, 1916.

*Definition*.—**AMIDOSTOMINÆ** : mouth directed straight forwards, buccal capsule resembles that of *Amidostomum*, in its depth is a long triangular denticle directed forwards ; narrow cervical and

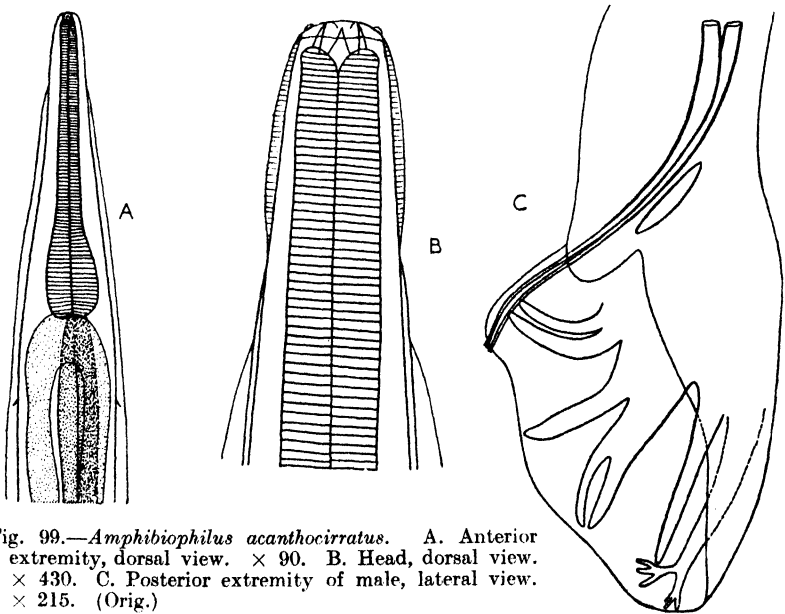


Fig. 99.—*Amphibiophilus acanthocirratus*. A. Anterior extremity, dorsal view.  $\times 90$ . B. Head, dorsal view.  $\times 430$ . C. Posterior extremity of male, lateral view.  $\times 215$ . (Orig.)

well-developed lateral flanges present. Male : bursal formula—ventro-ventral and latero-ventral rays fused proximally, externo-lateral arises from a common trunk with the other laterals, medio-lateral and postero-lateral fused proximally, externo-dorsal arises from a common trunk with the dorsal, dorsal bifurcated, each branch tridigitate ; spicules equal and bifurcate at distal extremity ; gubernaculum present. Female : posterior extremity conical ; vulva in the posterior third of the body. Parasites of the intestine of frogs.

Type species: *A. acanthocirratus* Skrjabin, 1916. ♂ 7 mm., ♀ 11–12 mm. In frogs.

Ref. 573.

Genus **EPOMIDIOSTOMUM** Skrjabin, 1916.

*Definition.*—AMIDOSTOMINÆ: mouth directed straight forwards, on the dorsal and ventral surfaces of the head is a pair of posteriorly directed nodules (epaulettes) with blunt extremities, on each side is a pair of lateral papillæ; buccal capsule short, limited to the cephalic region; three axially arranged chitinous lamellæ within the œsophagus. Male: bursa with two lateral lobes and a smaller

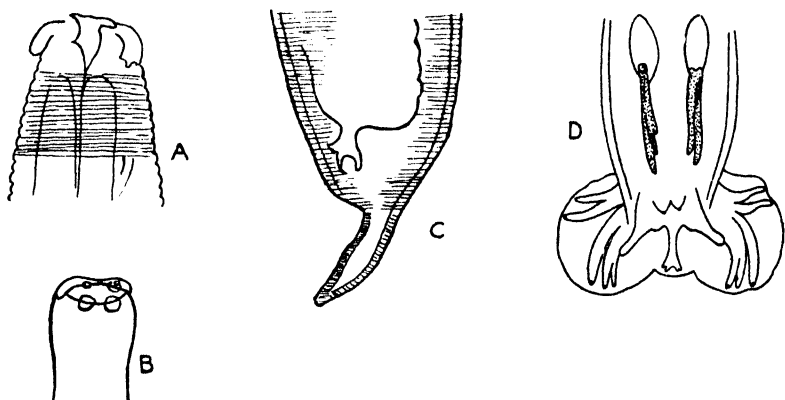


Fig. 100.—*Epomidiostomum uncinatum*. A. Head, showing lappets. B. Head, showing papillæ. C. Posterior extremity of female, lateral view. D. Posterior extremity of male, dorsal view. (After Skrjabin.)

dorsal lobe; with the following formula—ventro-ventral and latero-ventral rays parallel, externo-lateral ray close to the other lateral rays, medio-lateral and postero-lateral fused proximally, externo-dorsal ray short, thick, and arising at the base of the dorsal, dorsal bifurcated at its tip, each branch bidigitate; in addition there are two large sessile papillæ on the posterior lip of the cloaca; spicules short, equal, and terminating in three branches; gubernaculum absent. Female: body narrows rapidly behind the anus and ends in a long digitiform tail bearing about its posterior third two distinct caudal pores; vulva behind the middle of the body. Oviparous. Parasites of the gizzard wall of birds.

Type species: *E. uncinatum* (Lundhal, 1848). ♂ 7 mm., ♀ 11.5 mm. In *Anas* spp.

Syn., *Strongylus uncinatus* Lundhal, 1848.

*Epomidiostomum anatinum* Skrjabin, 1916.

Other species :

*E. orispinum* (Molin, 1861). In *Anas* spp.

Syn., *Strongylus orispinus* Molin, 1861.

*Strongylus anseris* Zeder, 1800, in part.

Refs. 360, 551, 572, 681.

#### FAMILY SYNGAMIDÆ LEIPER, 1912.

*Definition*.—STRONGYLOIDEA : with a well-developed chitinous buccal capsule, the oral margin of which is not supplied with teeth or other cutting organs, but is thickened to form a prominent chitinous rim. Parasites of respiratory system.

Genus SYNGAMUS Siebold, 1836.

Syn., *Cyathostoma* E. Blanchard, 1849.

*Definition*.—SYNGAMIDÆ : with a well-developed buccal capsule provided at its surface with a large chitinous ring, and in its depth with a variable number (usually six) of small triangular teeth ; with two lateral and four submedian head papillæ. The males are

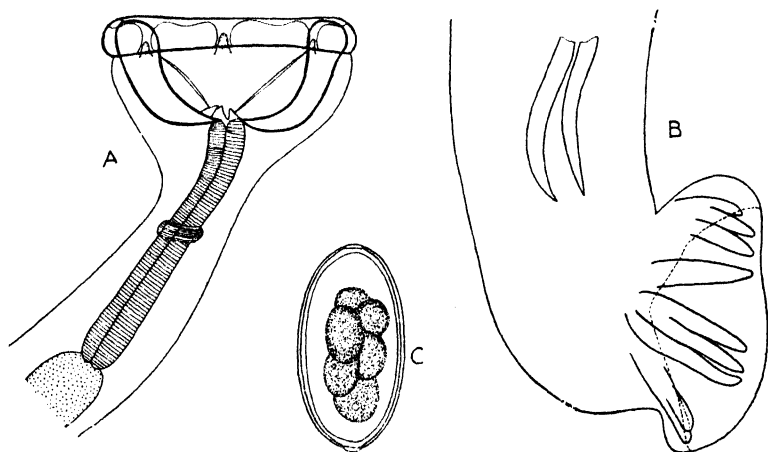


Fig. 101.—*Syngamus trachea*. A. Anterior extremity, lateral view.  $\times 42$ . B. Posterior extremity of male, lateral view.  $\times 67$ . C. Egg.  $\times 300$ . (Orig.)

much smaller than the females to which they are permanently coupled. Male : bursa short ; with the following formula—ventral ray cleft, externo-lateral arising separately from the other laterals, but lying close to them, medio-lateral and postero-lateral lying close together and parallel, externo-lateral arises separately from the dorsal, dorsal bifurcated for about half its length or more, each

branch usually bi- or tri-digitate ; spicules equal, lightly chitinized, usually fairly stout, and short ; gubernaculum absent. Female : posterior extremity conical ; vulva in the anterior part of the body ; uteri parallel. Oviparous, eggs of very characteristic shape slightly flattened on one side. Parasites of the respiratory tract of birds and mammals.

Type species : *S. trachea* (Montagu, 1811). ♂ 2·6 mm., ♀ 5-20 mm. In *Gallus* sp., *Pavo* sp., *Phasianus* sp., *Meleagris* sp., *Anser* sp., *Corvus* spp., etc.

Syn., *Fasciola trachea* Montagu, 1811.

*Syngamus trachealis* Sieb., 1836.

*Strongylus pictus* Creplin, 1849.

*Syngamus bifurcatus* Theobald, 1896.

*Syngamus mucronatus* Schlotthauber, 1860.

*Syngamus primitivus* Molin, 1861.

*Syngamus sclerostomum* Molin, 1861.

#### Other species :

*S. americanus* (Chapin, 1925). In *Buteo borealis*.

*S. boularti* Mégnin, 1844. In *Casuaris galeatus*.

*S. bronchialis* Muehlig, 1884. In *Anser* sp.

*S. caelebs* Schlotthauber, 1860. In *Falco lagopus*.

*S. coscorobæ* (Chapin, 1925). In *Coscoroba coscoroba*.

*S. dispar* (Dies., 1851). In *Felis concolor*.

*S. gracilis* Chapin, 1925. In *Corvus brachyrhynchos*.

*S. hippopotami* Gedoelst, 1924. In *Hippopotamus* sp.

*S. kingi* Leiper, 1913. In *Homo sapiens*.

*S. lari* (E. Blanchard, 1849). In *Larus* sp.

Syn., *Cyathostoma lari* Blanchard, 1849.

*S. laryngeus* Railliet, 1899. In cattle.

*S. microspiculum* Skrjabin, 1915. In *Phalacrocorax* sp.

*S. nasicola* Linstow, 1899. In *Capra* sp., *Cervus* sp.

*S. parvus* Chapin, 1925. In *Nucifraga caryocatactes*.

*S. pugionatus* Schlotthauber, 1860. In *Corvus* sp., *Sturnus* sp.

*S. tadornæ* (Chatin, 1874). In *Tadorna* sp.

*S. variegatus* (Creplin, 1849). In *Ciconia* sp.

Chapin (1925) in a recent paper has separated the genus *Cyathostoma* Blanchard, 1849, from *Syngamus* Siebold, 1836, on the following grounds. In *Syngamus* the buccal capsule is provided with eight or nine teeth in its depth, the bursa is thick-walled, the rays short and thick, and the spicules small to very small ; in *Cyathostoma* the buccal capsule has six or seven teeth in its depth, the bursa is of the usual strongyliform type, the rays are slender and the spicules long and filiform. He includes the following



species in *Cyathostoma*—*lari*, *americanum*, *boularti*, *bronchialis*, *coscorobæ*, *tadornæ*, and *variegatum*.

Refs. 55, 93a, 291, 351, 380, 403, 572.

#### FAMILY METASTRONGYLIDÆ LEIPER, 1908.

*Definition*.—STRONGYLOIDEA: body generally filiform, mouth directed straight forwards, simple, with or without a very feeble buccal capsule. Bursa copulatrix well-developed with more or less typical rays. Parasites of respiratory and circulatory systems of mammals.

#### Subfamily METASTRONGYLINÆ Leiper, 1908.

*Definition*.—METASTRONGYLIDÆ: with the characters of the family.

#### KEY TO GENERA.

1. Cuticle armed with a series of rings of minute spines along whole or part of the body . . . . Crenosoma, p. 165.  
Cuticle not armed with spines . . . . 2
2. Dorsal ray of bursa thick and undivided except at its extremity . . . 3  
Dorsal ray doubled, each limb being thin . . . . . 5
3. Posterior extremity of male reinforced by a chitinous arc . . . Synthetocaulus, p. 162.  
Posterior extremity of male not reinforced by a chitinous arc . . . 4
4. Externo-lateral ray fused with the medio-lateral except at tip; gubernaculum present . . . Troglstrongylus, p. 164.  
Externo-lateral ray separate from medio-lateral, gubernaculum absent . . . . . Hæmostrongylus, p. 164.
5. Dorsal rays simple at extremity, spicules long and thin . . . . Metastrongylus, p. 158.  
Dorsal rays bilobed or trilobed at extremity, spicules short and thick . . . . . Dictyocaulus, p. 161.

#### Genus METASTRONGYLUS Molin, 1861.

*Definition*.—METASTRONGYLINÆ: body filiform; cuticle smooth; mouth bounded by two lateral trilobed lips, the median

lobes being the largest ; buccal cavity very small ; œsophagus slightly club-shaped posteriorly ; excretory pore just behind the nerve ring. Male : bursa with large lateral lobes and a very small dorsal lobe ; with the following formula—ventro-ventral and latero-ventral rays definitely separated from each other, externo-lateral large and arises separately from the other laterals, medio-

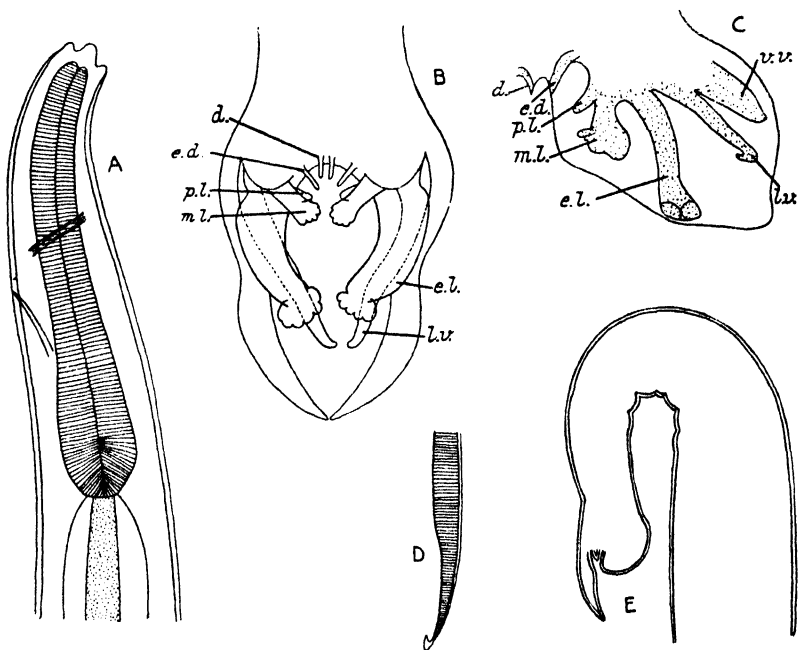


Fig. 102.—*Metastrongylus (Metastrongylus) salmi*. A. Anterior extremity, lateral view.  $\times 90$ . B. Bursa, dorsal view. *d*, dorsal ray ; *e.d*, externo-dorsal ray ; *p.l*, postero-lateral ray ; *m.l*, medio-lateral ray ; *e.l*, externo-lateral ray ; *l.v*, latero-ventral ray.  $\times 90$ . (Orig.). *Metastrongylus (Metastrongylus) elongatus*. C. Bursa, lateral view. *d*, dorsal ray ; *e.d*, externo-dorsal ray ; *p.l*, postero-lateral ray ; *m.l*, medio-lateral ray ; *e.l*, externo-lateral ray ; *l.v*, latero-ventral ray ; *v.v*, ventro-ventral ray. (After Stephens. D. End of spicule.  $\times 75$ . E. Posterior extremity of female, lateral view.  $\times 75$ . (After Geddoelst.)

lateral large, and the postero-lateral is represented by a small branch arising from it, externo-dorsal small, thin, and arising separately from the dorsal, dorsal doubled, small, and thin ; spicules long and delicate with a transversely striated wing ; gubernaculum present or absent. Female : posterior extremity straight or bent upon itself, narrows suddenly behind the anus and ends as a conical tail ; vulva near anus ; uteri parallel. Oviparous. Parasites of bronchi of pigs.

Type species: *M. elongatus* (Duj., 1845). ♂ 16–18 mm., ♀ 39–42 mm. In the pig.

Syn., *Strongylus elongatus* Duj., 1845.

*Ascaris apri* Gmelin, 1790, in part.

*Strongylus suis* Rudolphi, 1809, in part.

*Strongylus paradoxus* Mehlis, 1831, in part.

*Strongylus longevaginatus* Dies., 1851.

Other species:

*M. pudendotectus* Wostokow, 1905. In the pig.

Syn., *M. brevivaginatus* Railliet and Henry, 1907.

*M. salmi* Gedoelst, 1923. In the pig.

Gedoelst (1923) has subdivided the genus into the following subgenera:—

**Subgenus METASTRONGYLUS (Molin, 1861) Gedoelst, 1923.**

*Definition.*—The bursa is small, its axis is more or less parallel to that of the worm, and its wall is thickened in its distal half; the latero-ventral ray is bent dorsally at its extremity and the externo-lateral is more or less lobulated at its extremity; the spicules terminate in a single barb; the posterior extremity of the female is bent upon itself, and is without a cuticular dilatation covering the orifices of the vulva and anus. Contains the species *elongatus* and *salmi*.

**Subgenus CHÆROSTRONGYLUS Gedoelst, 1923.**

*Definition.*—The bursa is voluminous, its axis is at right angles to that of the worm, and its wall is not thickened in its distal half; the latero-

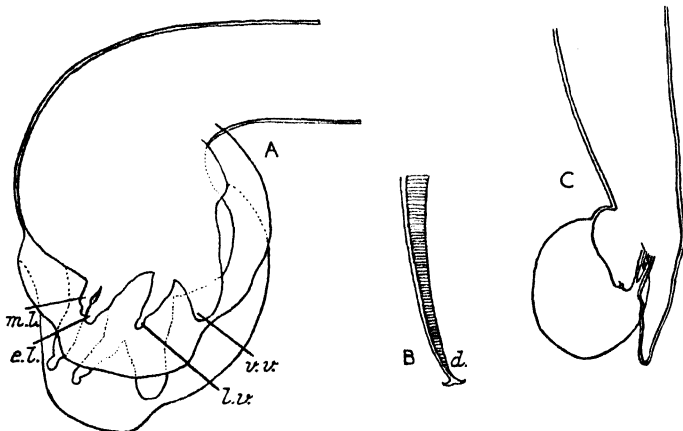


Fig. 103.—*Metastrongylus* (*Chærostrongylus*) *pudendotectus*. A. Posterior extremity of male, lateral view. *m.l.*, medio-lateral ray; *e.l.*, externo-lateral ray; *l.v.*, latero-ventral ray; *v.v.*, ventro-ventral ray;  $\times 75$ . B. End of spicule.  $\times 75$ . C. Posterior extremity of female, lateral view.  $\times 75$ . (After Gedoelst.)

ventral ray is straight at its extremity and the externo-lateral is not lobulated at its extremity; the spicules terminate in a double barb; the

posterior extremity of the female is straight, and presents a cuticular dilatation covering the orifices of the vulva and anus. Contains the species *pudendotectus* (*brevivaginus*).

Refs. 123, 131, 159, 185, 291, 351a, 360, 417, 432, 476, 582, 590, 667.

Genus *DICTYOCAULUS* Railliet and Henry, 1907.

*Definition.*—*METASTRONGYLINÆ*: body filiform; mouth surrounded by four small lips, the dorsal and ventral a little larger

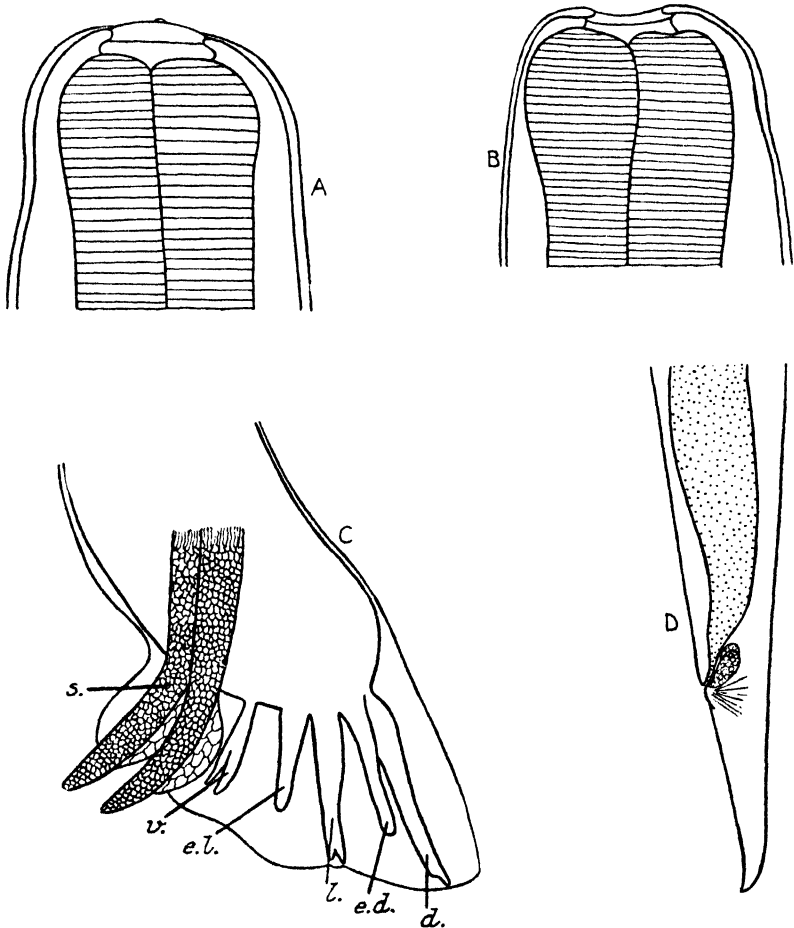


Fig. 104.—*Dictyocaulus filaria*. A. Head, dorsal view.  $\times 256$ . B. Head, lateral view.  $\times 256$ . C. Posterior extremity of male, lateral view. s, spicule; v, vulva; e.l., externo-lateral ray; l, medio-lateral and postero-lateral rays fused; e.d., externo-dorsal ray; d, left branch of dorsal ray.  $\times 90$ . D. Posterior extremity of female, lateral view.  $\times 56$ . (Orig.)

than the lateral ; there is a very small buccal capsule about twice as broad as it is deep, the posterior portion of which is surrounded by a thick chitinous ring. Male : bursal formula—ventral ray-cleft, externo-lateral arises separately from the other laterals, medio-lateral and postero-lateral fused except at their tips, externo-dorsal arises separately from the dorsal, dorsal doubled and bilobed or trilobed at its extremity ; spicules equal, short, and stout ; gubernaculum present. Female : vulva near the middle of the body. Oviparous or viviparous. Parasitic in bronchi of herbivora.

Type species : *D. filaria* (Rudolphi, 1809). ♂ 30–80 mm., ♀ 50–100 mm. In sheep and goats.

Syn., *Strongylus filaria* Rud., 1809.

Other species :

*D. arnfieldi* (Cobbold, 1884).  
In *Equidæ*.

*D. hadweni* Chapin, 1925. In  
*Bison bison*, *Alce americanus*, *Cervus canadensis*.

*D. viviparus* (Bloch, 1782).  
In *Bovidæ*, rarely in  
*Equidæ*.

Syn., *D. micrurus* (Mehl., 1831). In ox, goat, deer.

*D. nærneri* Railliet and Henry, 1907. In deer.

Refs. 93b, 117, 360, 398, 417, 476, 493.

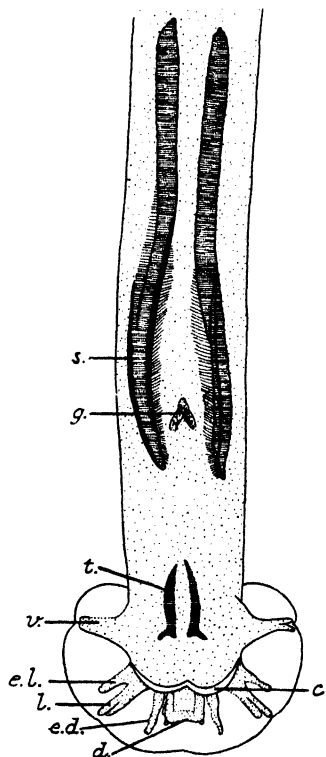


Fig. 105.—*Synthesetocaulus commutatus*. Posterior extremity of male, ventral view. *v*, ventral rays ; *e.l.*, externo-lateral ray ; *l.*, medio-lateral and postero-lateral rays fused ; *e.d.*, externo-dorsal ray ; *d.*, dorsal ray ; *s*, spicule ; *g*, gubernaculum ; *c*, chitinous arc ; *t*, telamon.  $\times 200$ . (After Railliet.)

Genus **SYNTHETOCAULUS** Railliet and Henry, 1907.

**Definition.**—**METASTRONGYLINÆ** : body capillary, mouth with three lips, and six small head papillæ. Male : posterior extremity of body reinforced by a chitinous arc ; bursal formula—ventral ray cleft at its extremity, externo-lateral and other laterals arise from a common trunk, medio-lateral and postero-lateral fused for about half their length, externo-dorsal arising separately

trium of body reinforced by a chitinous arc ; bursal formula—ventral ray cleft at its extremity, externo-lateral and other laterals arise from a common trunk, medio-lateral and postero-lateral fused for about half their length, externo-dorsal arising separately

from the dorsal, dorsal a single thick trunk ending in a few short digitations; spicules equal, fairly stout, and striate or pectinate; gubernaculum present, and in addition, more posteriorly two parallel chitinous structures (telamon). Female: vulva a little in front of the anus. Oviparous, eggs unsegmented when deposited. Parasites of the respiratory system of rodents, carnivora, and ungulates.

Type species: *S. commutatus* (Dies., 1851). ♂ 18–33 mm., ♀ 28–58 mm. In *Lepus* sp.

Syn., *Strongylus commutatus* Diesing, 1851.

*Filaria pulmonalis* Froelich, 1802, in part.

*Filaria leporis pulmonalis* Froel., 1802, Rud., 1819.

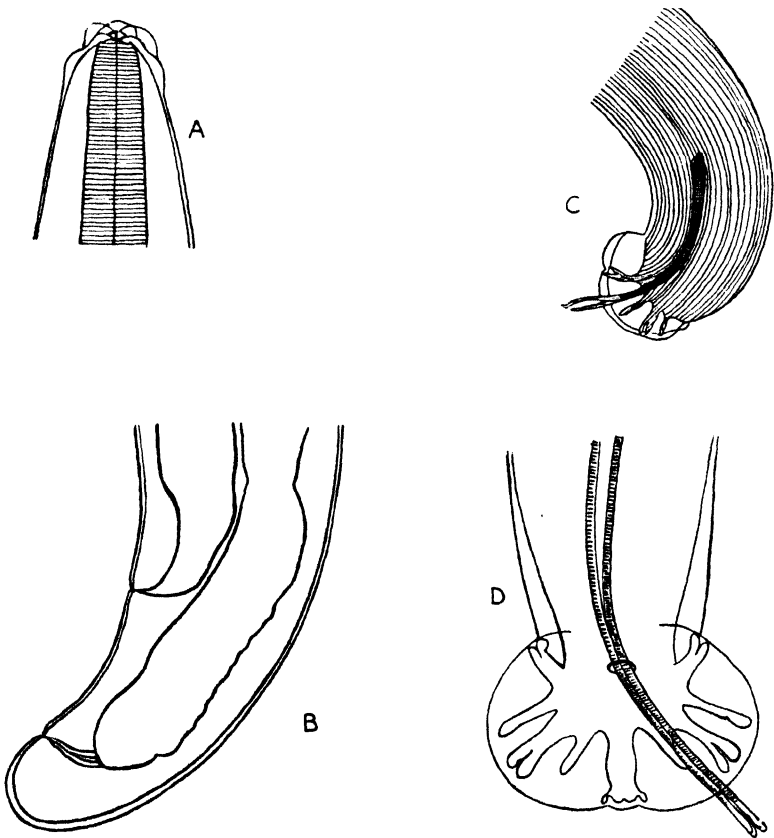


Fig. 106.—*Hæmostrongylus vasorum*. A. Anterior extremity.  $\times 144$ . B. Posterior extremity of female, lateral view.  $\times 144$ . (After Railliet and Henry.) C. Posterior extremity of male, lateral view.  $\times 80$ . (After Railliet.) *Hæmostrongylus subcrenatus*. D. Posterior extremity of male, ventral view.  $\times 204$ . (After Railliet and Henry.)

## Other species :

*S. abstrusus* (Railliet, 1898). In cat.

*S. capillaris* (Mueller, 1889). In sheep and goats.

*S. linearis* Marotel, 1913. In sheep.

*S. ocreatus* Railliet and Henry, 1907. In sheep.

*S. rufescens* (Leuckart, 1865). In sheep, goat, and rabbit.

*S. sagittatus* (Mueller, 1890). In *Cervidæ*.

*S. unciphorus* Railliet and Henry, 1907. In goat and sheep.  
Refs. 139, 205, 207, 403, 417.

Genus **HÆMOSTRONGYLUS** Railliet and Henry, 1907.

*Definition.*—**METASTRONGYLINÆ**: body not capillary, mouth with six small lips or papillæ, buccal capsule absent. Male: bursal formula—ventral ray cleft at its extremity, externo-lateral arises separately from the other laterals, medio-lateral and postero-lateral fused for the greater part of their length, externo-dorsal arising separately from the dorsal, dorsal a single large thick trunk ending in a few short digitations; spicules equal, long, and delicate; gubernaculum absent. Female: vulva behind the middle of the body. Oviparous or viviparous. Parasites of circulatory or respiratory systems of carnivora.

Type species: *H. vasorum* (Baillet, 1866). ♂ 14–18 mm., ♀ 18–21 mm. In heart, pulmonary arteries, and eye of dog.

Syn., *Strongylus vasorum* Baillet, 1866.

Other species: *H. subcrenatus* Railliet and Henry, 1913. In *Felis pardus*.

Refs. 4a, 398, 417, 438, 439.

Genus **TROGLOSTRONGYLUS** VEVERS, 1922.

*Definition.*—**METASTRONGYLINÆ**: body filiform, mouth with two inconspicuous lips each having two minute papillæ; cuticle with fine longitudinal striations. Male: bursal formula—externo-lateral and medio-lateral rays fused, postero-lateral separated from the medio-lateral, externo-dorsal arises separately from the dorsal, dorsal single and broad owing to the fusion of all its elements; spicules long and equal, tessellated throughout, and carrying pectinate lamellæ along their inner edges, each ends in a palmate expansion the fingers of which are webbed, with a cuticular expansion which bears minute spines; gubernaculum dagger-shaped. Female: vulva just behind the middle of the body. Oviparous. Parasites of carnivora.

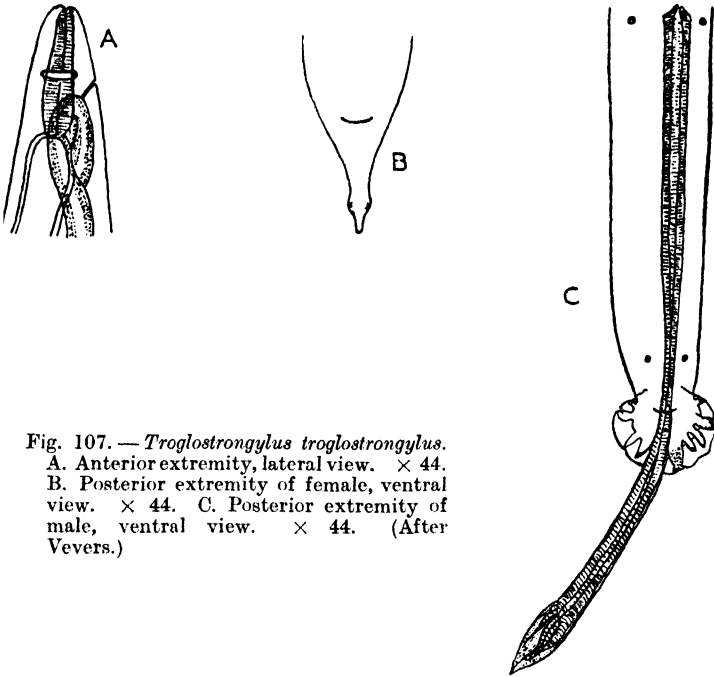


Fig. 107. — *Troglostrongylus troglostrongylus*.  
 A. Anterior extremity, lateral view.  $\times 44$ .  
 B. Posterior extremity of female, ventral view.  $\times 44$ . C. Posterior extremity of male, ventral view.  $\times 44$ . (After Vevers.)

Type species : *T. troglostrongylus* Vevers, 1922. In frontal sinus of *Felis bengalensis*.

Ref. 656.

Genus **CRENOSOMA** Molin, 1861.

*Definition*.—**METASTRONGYLINÆ**: cuticle armed along the whole, or only the anterior part, of the body with a series of rings composed of minute spines; mouth circular, buccal capsule very small. Male: bursa consisting of two large lateral lobes and a dorsal lobe; bursal formula—ventro-ventral and latero-ventral rays parallel, externo-lateral arises separately from the other laterals, medio-lateral and postero-lateral lying close together and parallel, externo-dorsal arises separately from the dorsal, the dorsal undivided except at its tip where it ends in a number of minute digitations; spicules equal and fairly long; gubernaculum present. Female: vulva near the middle of the body; posterior extremity of female tapers rapidly to a blunt point; tail furnished with two small lateral papillæ. Viviparous. Parasites of carnivora and insectivora.

Type species: *C. striatum* (Zeder, 1800). ♂ 5–7 mm., ♀ 12–13 mm. In bronchi of *Erinaceus europæus*.

Syn., *Strongylus striatus* Zeder, 1800.



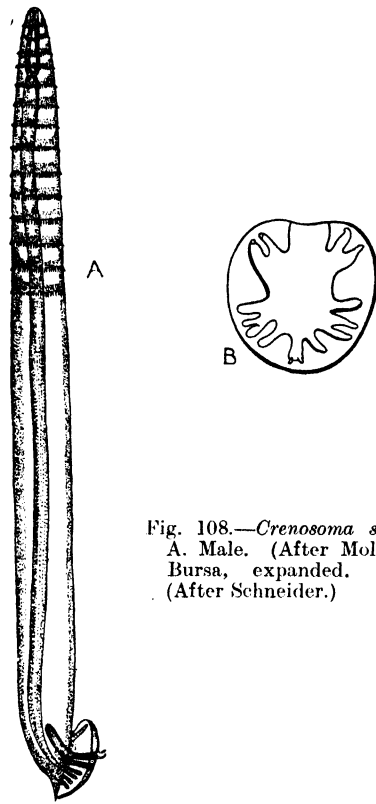


Fig. 108.—*Crenosoma striatum*.  
A. Male. (After Molin.) B.  
Bursa, expanded.  $\times 90$ .  
(After Schneider.)

Other species :

*C. decoratum* (Creplin, 1847). In bronchi of *Canis vulpes*.

Syn., *Strongylus decoratus* Creplin, 1847.

*Crenosoma semiarmatum* Molin, 1861.

Refs. 115, 123, 131, 360, 403, 419, 480, 603, 681.

#### FAMILY PSEUDALIIDÆ RAILLIET, 1916.

*Definition*.—STRONGYLOIDEA : with a rudimentary bursa consisting of a cuticular prolongation supported by a few atypical rays.

Subfamily PSEUDALIINÆ Railliet and Henry, 1909.

*Definition*.—PSEUDALIIDÆ : with the characters of the family.

#### KEY TO GENERA.

1. Bursa consists of two elongated lateral lobes ; posterior end of female bent dorsally and conical. . . . . *Pseudalius*, p. 168.

Bursa not consisting of two elongated lateral lobes; posterior end of female truncate . . . . . 2

2. With a definite shallow buccal capsule . . . . . Stenurus, p. 168.

Without a definite buccal capsule . . . . . 3

3. With a prebursal sucker-like organ . . . . . Torynurus, p. 171.

Without a prebursal sucker-like organ . . . . . Halocercus, p. 171.

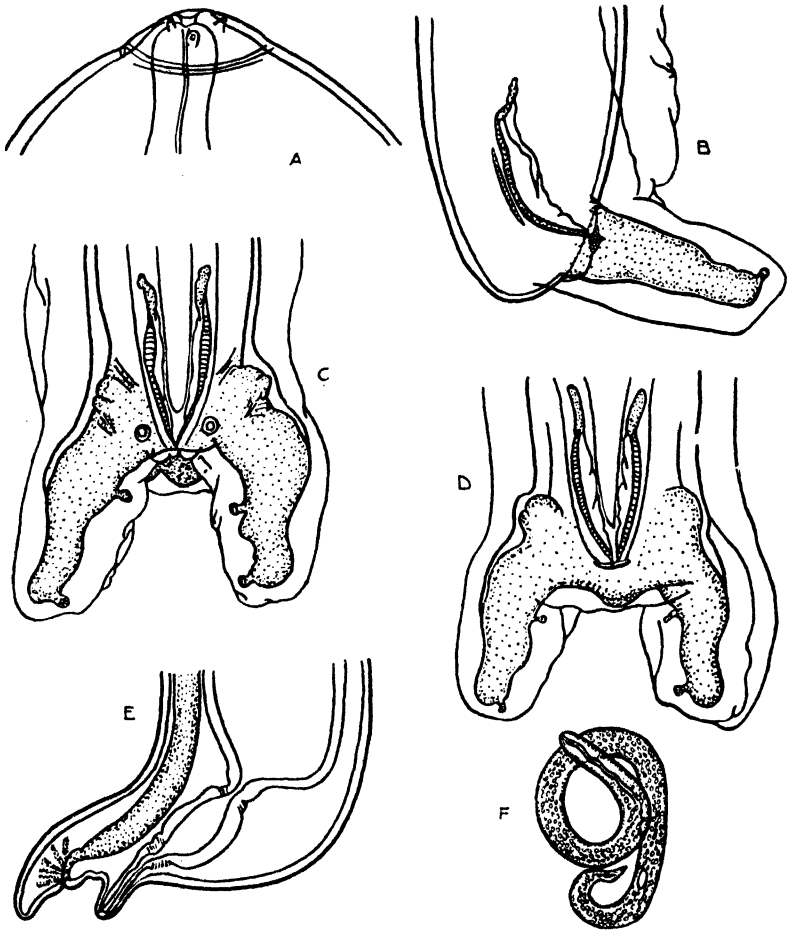


Fig. 109.—*Pseudalius inflexus*. A. Anterior extremity of female, lateral view.  $\times 120$ . B. Posterior extremity of male, lateral view.  $\times 110$ . C. Posterior extremity of male, ventral view.  $\times 110$ . D. Posterior extremity of male, dorsal view.  $\times 110$ . E. Posterior extremity of female, lateral view.  $\times 30$ . F. Embryo from uterus.  $\times 260$ . (After Baylis and Daubney.)

Genus **PSEUDALIUS** Dujardin, 1845.

*Definition.*—**PSEUDALIINÆ**: body relatively thick anteriorly, tapering posteriorly, especially in the male; head bluntly conical; mouth very small and circular, without a buccal capsule; cuticle with an annular fold slightly behind the anterior end, the head being to some extent retractile. Male: bursa reduced to two elongated lateral lobes projecting ventrally almost at right angles to the longitudinal axis of the body and each containing a lateral ray, bearing on its inner surface two papillary terminations, one near the extremity and one near the base; these lobes are joined dorsally by a flange of cuticle in the middle of which there is a slight indication of a dorsal lobe; spicules short, membranous, folded and not fused at the tips; gubernaculum present. Female: posterior extremity bent dorsally in front of the vulva, which is near the anus at the extremity of a tubular outgrowth. Viviparous. Parasites of bronchi, blood-vessels, and heart of porpoises.

Type species: *P. inflexus* (Rud., 1809). ♂ 120–140 mm., ♀ 120–160 mm. In *Phocæna phocæna*.

Syn., *Strongylus inflexus* Rud., 1809, not *Stenurus inflexus* Duj., 1845.

*Strongylus major* Raspail, 1829.

*P. filum* Dujardin, 1845.

*Prosthecosacter inflexus* (Rud., 1809) Dies., 1851.

*Pseudalius inflexus* (Rud., 1809) Schneider, 1866.

Refs. 45a, 48, 98, 103, 123, 131, 253a, 253b, 253c, 360, 405, 419, 435, 480.

Genus **STENURUS** Dujardin, 1845.

Syn., *Pharurus* Leuckart, 1848.

*Prosthecosacter* Diesing, 1851.

*Definition.*—**PSEUDALIINÆ**: body relatively stout anteriorly, tapering posteriorly; with a shallow buccal capsule; the cuticular lining of the œsophagus is thickened for some distance at the anterior end forming an œsophageal funnel. Male: bursa well-developed and more or less divided into a dorsal lobe and a pair of lateral lobes; each of the latter contains a lateral ray with a trilobate extremity and a single papillary termination on its inner surface, and also a ventral ray with a single termination; the dorsal ray is relatively elongated and has a pair of ventral terminations near its tip; spicules broad, membranous, folded, and fused at their tips; gubernaculum present. Female: posterior extremity truncate with a small terminal button situated dorsally;

vulva with a cuticular process on its anterior lip and situated near the anus which is subterminal. Viviparous. Parasites of bronchi,

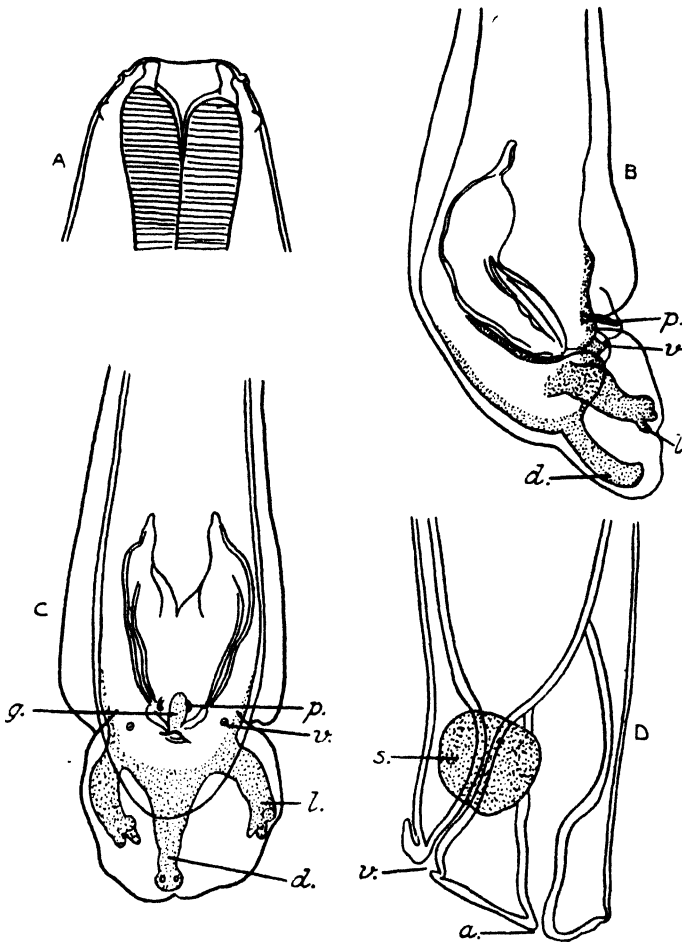


Fig. 110.—*Stenurus minor*. A. Anterior extremity of female, lateral view.  $\times 200$ . B. Posterior extremity of male, lateral view. *p.*, prebursal ray; *v.*, ventral ray; *l.*, lateral ray; *d.*, dorsal ray.  $\times 200$ . C. Posterior extremity of male, ventral view. *p.*, prebursal ray; *v.*, ventral ray; *l.*, lateral ray; *d.*, dorsal ray; *g.*, gubernaculum. D. Posterior extremity of female, lateral view. *s.*, sphincter; *v.*, vulva; *a.*, anus.  $\times 200$ . (After Baylis and Daubney.)

tympanic cavity, and blood-vessels of whales, porpoises, and dolphins.

Type species: *S. minor* (Kuhn, 1829). ♂ 21 mm., ♀ 26 mm. In *Phocæna phocæna*.

Syn., *Strongylus minor* Kuhn, 1829.

*Stenurus inflexus* Dujardin, 1845, not *Strongylus inflexus* Rud., 1809.

*Prosthecosacter minor* (Kuhn, 1829) Dies., 1851.

*Pseudalius minor* (Kuhn, 1829) Schneider, 1866.

*Pharurus minor* (Kuhn, 1829) Cobbold, 1879.

Other species :

*S. alatus* (Leuckart, 1848). In *Monodon monoceros*.

*S. arcticus* (Cobb, 1888). In *Beluga leucas*.

Syn., *Strongylus pallasii* Beneden, 1870. [Nomen nudum.]

*S. globicephalæ* Baylis and Daubney, 1925. In *Globicephala melæna*.

*S. ovatus* (Linstow, 1910). In *Tursiops truncatus*.

Refs. 45a, 48, 98, 103, 123, 125, 131, 253a, 253b, 253c, 297, 360, 405, 419, 435, 480.

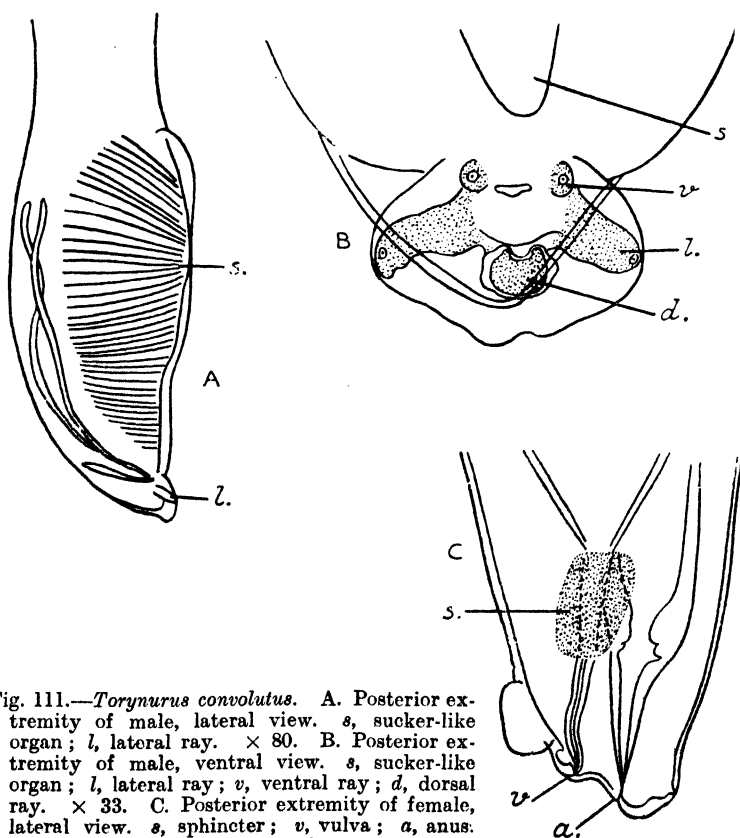


Fig. 111.—*Tornyurus convolutus*. A. Posterior extremity of male, lateral view. *s*, sucker-like organ; *l*, lateral ray.  $\times 80$ . B. Posterior extremity of male, ventral view. *s*, sucker-like organ; *l*, lateral ray; *v*, ventral ray; *d*, dorsal ray.  $\times 33$ . C. Posterior extremity of female, lateral view. *s*, sphincter; *v*, vulva; *a*, anus.  $\times 190$ . (After Baylis and Daubney.)

Genus **TORYNURUS** Baylis and Daubney, 1925.

*Definition.*—**PSEUDALIINÆ**: without a buccal capsule, but cuticle slightly thickened where it is invaginated to form the mouth. Male: posterior extremity thickened and terminating in a bursa which is ventrally placed and roughly circular in outline and not clearly divided into lobes; bursa with a pair of large lateral rays and a short dorsal ray; ventrally, in front of the bursa, there is an area surrounded by a free cuticular border and containing an elongated, median, muscular, sucker-like organ; spicules slender, with membranous alæ extending for a considerable part of their length, and filiform unfused tips; gubernaculum present. Female: posterior extremity truncate resembling that of *Stenurus*. Parasites of bronchi and pulmonary blood-vessels of porpoises and whales.

Type species: *T. convolutus* (Kuhn, 1829). ♂ 38 mm., ♀ 45 mm. In *Phocæna phocæna* and *Globicephala melæna*.

Syn., *Strongylus convolutus* Kuhn, 1829.

*Prosthecosacter convolutus* (Kuhn, 1829) Dies., 1851.

*Prosthecosacter convolutus* (Kuhn, 1829) Cobbold, 1864.

*Pseudalius convolutus* (Kuhn, 1829) Schneider, 1866.

? *Pseudalius bicostatus* Linstow, 1906.

Refs. 45a, 98, 123, 253c, 480.

Genus **HALOCERCUS** Baylis and Daubney, 1925.

*Definition.*—**PSEUDALIINÆ**: mouth small with a slight cuticular invagination. Male: posterior end somewhat conical furnished in the genotype with a very much reduced ventrally-placed bursa not clearly divided into lobes; bursal rays extremely thick and short; spicules relatively long and slender, tubular proximally and alate distally, not fused at the tips; gubernaculum feebly-developed. Female: posterior extremity truncate or obliquely conical; vulva near the anus, without definite cuticular swellings. Viviparous. Parasites of bronchi of dolphins.

Type species: *H. delphini* Baylis and Daubney, 1925. ♂ 50–65 mm., ♀ 60–90 mm. In *Delphinus delphis*.

Other species:

*H. gymnurus* (Railliet, 1899). In *Phoca vitulina*.

Syn., *Pseudalius gymnurus*.

*H. inflexocaudatus* (von Siebold, 1842). In *Phocæna phocæna*.

Syn., *Filaria inflexocaudata* von Siebold, 1842.

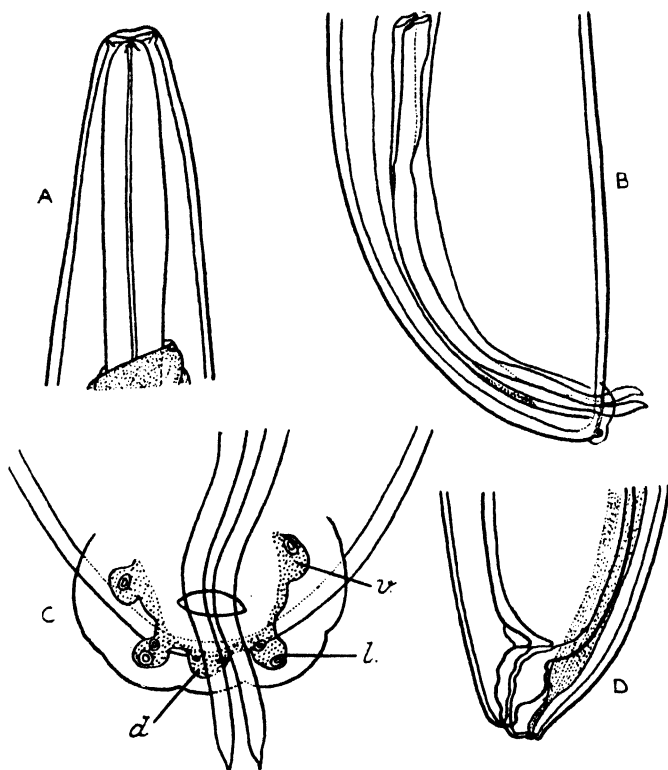


Fig. 112.—*Halocercus delphini*. A. Anterior extremity of female, lateral view.  $\times 260$ . B. Posterior extremity of male, lateral view.  $\times 100$ . C. Posterior extremity of male, ventral view. *v*, ventral ray; *l*, lateral ray; *d*, dorsal ray.  $\times 260$ . D. Posterior extremity of female, lateral view.  $\times 100$ . (After Baylis and Daubney.)

*H. lagenorhynchi* Baylis and Daubney, 1925. In *Lagenorhynchus albirostris*.

Ref. 45a.

### **STRONGYLOIDEA insufficiently known.**

Genus **DELETROCEPHALUS** Diesing, 1851.

*Definition*.—**STRONGYLOIDEA**: head compressed laterally with six head papillæ, mouth directed straight forward, elliptical with longest diameter dorso-ventral; buccal capsule globular, the oral margin being provided with six radially striated membranous expansions; the wall of the capsule is supported by six longitudinal ribs. At the bottom of the capsule are twelve small teeth of which two, at the base of the duct of the dorsal œsophageal gland, are a little larger than the rest. From the anterior end of the œsophagus there arise solid dorsal and ventral bulgings

immediately behind the mouth capsule. Male: bursal formula—ventral ray cleft, externo-lateral arising from a common trunk with the other laterals, externo-dorsal arising from common trunk with the dorsal, dorsal forked at its extremity, each branch giving off immediately three delicate sub-branches; spicules long and

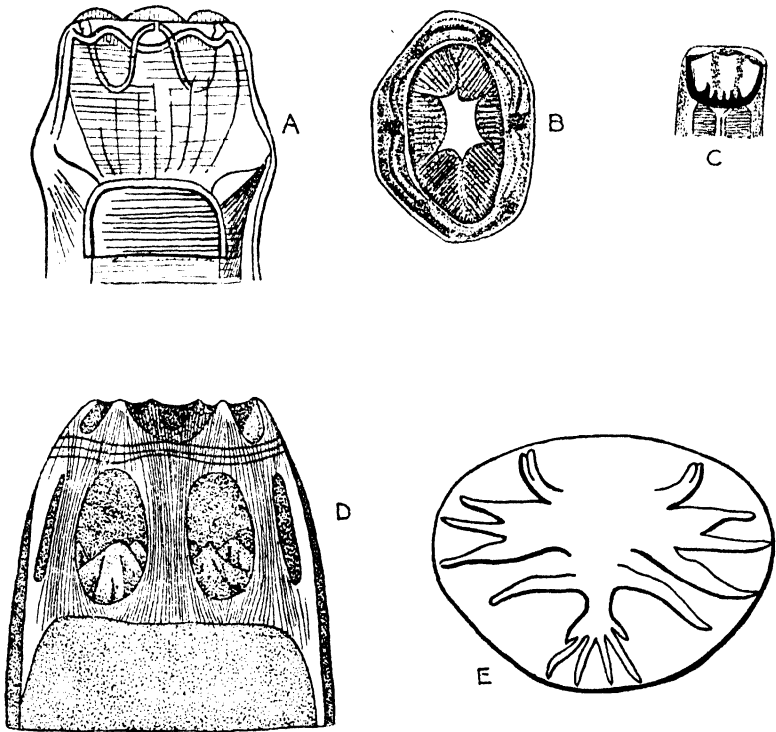


Fig. 113.—*Deletrocephalus dimidiatus*. A. Head, lateral view.  $\times 90$ . B. Head, end-on view. (After Schneider.) C. Head. (After Railliet and Henry.) D. Head. (After Diesing.) E. Bursa.  $\times 160$ . (After Schneider.)

delicate. Female: vulva near anus and covered by a cuticular expansion. Eggs with thin shell. Parasites of ostriches.

Type species: *D. dimidiatus* Dies., 1851.  $\sigma$  11–18 mm.,  $\phi$  17–24 mm. In *Rhea americana*.

Refs. 123, 124, 360, 405, 420, 431, 435, 480.

#### Genus GLOBOCEPHALOIDES\* n. g.

**Definition.** — STRONGYLOIDEA? delicate worms, anterior extremity bent dorsally, cuticle with prominent transverse

\* This genus is possibly related to *Globocephalus*, but in the absence of the male, it is impossible to determine its exact position.



striations especially anteriorly; buccal capsule large and sub-globular; duct of dorsal oesophageal gland does not project into mouth capsule; there is a prominent triangular subventral tooth in the depth of the capsule; mouth opening circular, without a corona radiata; oesophagus slightly club-shaped posteriorly. Male: unknown. Female: posterior extremity tapers regularly behind the anus to end in a conical tail; vulva situated about

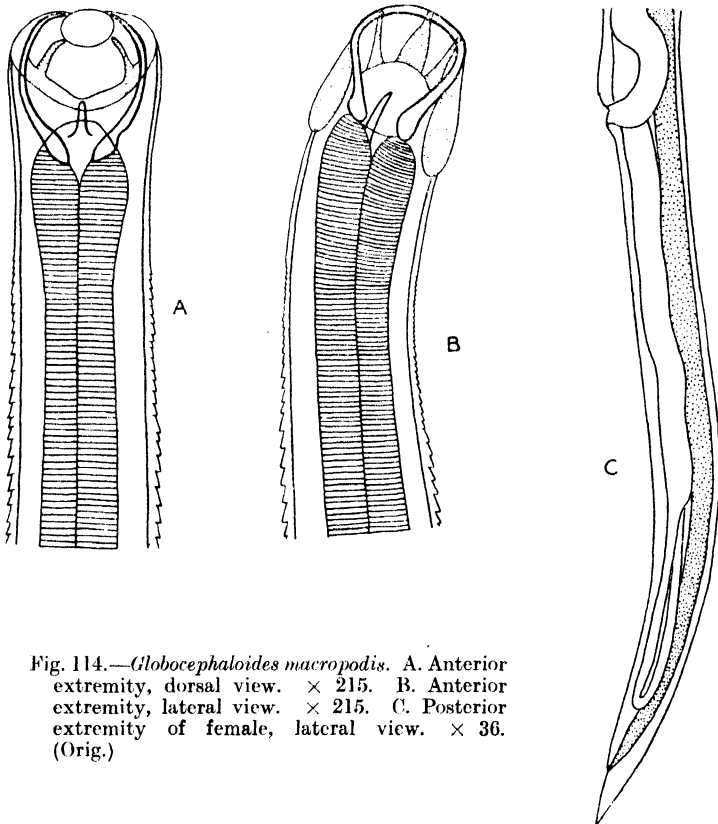


Fig. 114.—*Globocephaloides macropodis*. A. Anterior extremity, dorsal view.  $\times 215$ . B. Anterior extremity, lateral view.  $\times 215$ . C. Posterior extremity of female, lateral view.  $\times 36$ . (Orig.)

the commencement of the posterior fourth of the worm; vagina short; uteri divergent. Oviparous. Parasites of marsupials.

Type species: \**G. macropodis* n. sp. ♂? ♀ about 9 mm. In *Macropus* sp.

\* *Globocephaloides macropodis* n. sp.: the material available consisted of a single female which is about 9 mm. in length, the buccal capsule is about  $400\ \mu$  in depth, the length of oesophagus is about  $900\ \mu$ , the anus is about  $180\ \mu$  from the tip of the tail, and the vulva about 2.3 mm. in front of the anus.

Genus **CLOACINA** Linstow, 1898.

*Definition.*—**STRONGYLOIDEA**: cuticle thick and transversely striated, anterior extremity domed; mouth directed straight forwards and bounded by six rounded lips, a dorsal, ventral, and four submedian, the last bearing long head papillæ. At the base of the lips is a strong chitinous ring [? buccal capsule] with an undulating anterior border. Mouth opening leads into a long cylindrical vestibule; œsophagus narrow anteriorly and enlarges posteriorly. Male: bursa apparently closed ventrally; with the

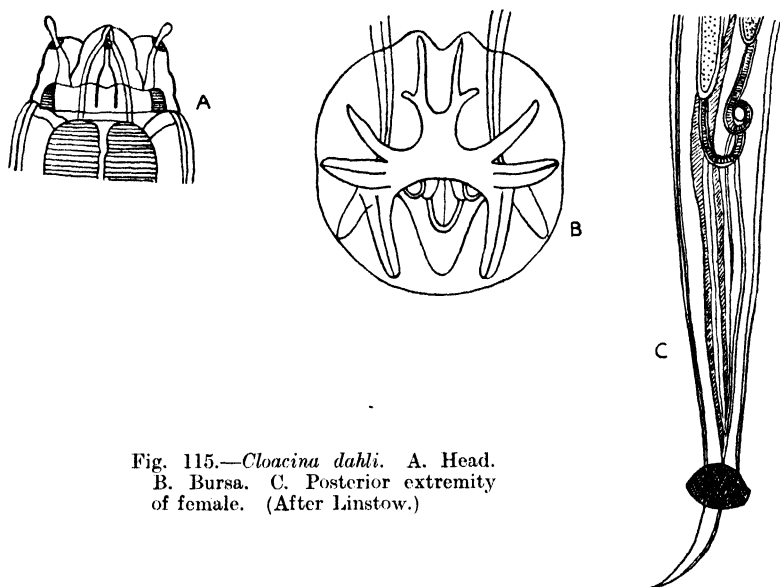


Fig. 115.—*Cloacina dahli*. A. Head.  
B. Bursa. C. Posterior extremity  
of female. (After Linstow.)

following formula \*—ventral ray cleft, externo-lateral separate from the other laterals, medio-lateral and postero-lateral fused, externo-dorsal arises separately from the dorsal, dorsal divided for about half its length, the two branches being widely separated and parallel, and each giving off a short accessory branch near its point of origin; spicules very long; gubernaculum? Female: posterior extremity narrowing suddenly behind the anus to end in a sharply-pointed tail; vulva very close to anus (Linstow was of the opinion that the vagina and rectum opened into a common cloaca, but Railliet and Henry, who have studied the worm, state that this is not the case). Female genitalia doubled. Oviparous.

\* Linstow appears to have figured the bursa upside down.

Type species : *C. dahl*i Linstow, 1898. ♂ 9 mm., ♀ 15 mm. In *Macropus browni*.

Refs. 317, 435, 440, 636.

Genus **ZONIOLAIMUS** Cobb, 1898.

*Definition*.—Cobb, who erected this genus, gave no description of it beyond the drawings, which are here reproduced, and his formula, giving some information regarding the size and position of certain of the organs.

Type species : *Z. setifera* Cobb, 1898.

♂ 7.5 mm., ♀ ? In *Macropus* sp.

Other species : *Z. brevicaudatus* Cobb, 1898. In *Macropus* sp.

Refs. 97, 440.

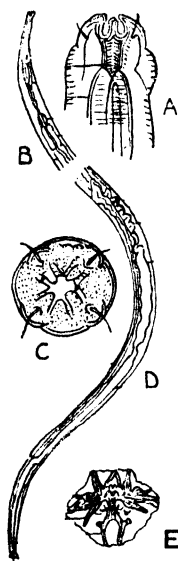


Fig. 116. — *Zoniolaimus setifera*. A. Head. B. Anterior extremity, lateral view. C. Head, end-on view. D. Posterior extremity of male. E. Bursa. (After Cobb.)

Railliet and Henry (1913) state that *Zoniolaimus* is synonymous with *Cloacina*, apparently on the grounds that both came from marsupials, and that the bursal formula is the same in both instances. Examination of the drawings given by Linstow, and by Cobb, causes one to doubt the accuracy of this assumption, the more especially as we have found in *Macropus* spp. a number of worms belonging to obviously different genera and all having approximately the same bursal formula. Whether either *Cloacina* or *Zoniolaimus* is identical with one of the genera described by us from *Macropus* species, it is impossible to state, in view of the inadequacy (or inaccuracy) of the descriptions of Linstow and Cobb. Travassos (1919) erected a family *Cloacinidæ* for the genus *Cloacina*

on the assumptions that the buccal capsule was absent, and that there was a cloaca in both sexes. As both these assumptions are probably incorrect, there is no justification for this family.

Superfamily **DIOCTOPHYMOIDEA** Railliet, 1916.

*Definition*.—**EUNEMATODA** : medium to large worms ; oesophagus without a posterior bulb. Male : with a closed, bell-shaped, muscular bursa copulatrix, not supported by rays ; spicule single. Female : with one ovary,

## FAMILY DIOCTOPHYMIDÆ RAILLIET, 1915.

Syn., *Eustrongylidæ* Leiper, 1908.*Eustrongylididæ* Leiper, 1912.

*Definition.*—DIOCTOPHYMOIDEA: medium to large worms; mouth without lips, but surrounded by six, twelve (or eighteen), papillæ arranged in one or two circles; cuticle coarsely striated with or without spines; vestibule short and thin-walled; œsophagus fairly long without a posterior bulb; nerve ring situated very anteriorly; excretory organs apparently absent. Male: bursa closed and bell-shaped, with muscular walls and without rays; with a single large spicule. Female: vulva near the anus, or in the anterior part of the body; vagina very long. Eggs with thick shell, their poles modified, and the surface covered with depressions. Parasites of mammals and birds.

## KEY TO GENERA.

1. Head and anterior part of body armed with spines . . . . . *Hystrichis*, p. 180.
- Head and anterior portion of body smooth . . . . . 2
2. Head papillæ six in one circle; vulva anterior . . . . . *Dioctophyme*, p. 177.
- Head papillæ twelve (or eighteen) arranged in two circles; vulva near anus . . . . . *Eustrongylides*, p. 178.

Genus **DIOCTOPHYME** Collet-Meygret, 1802.Syn., *Eustrongylus* Diesing, 1851.

*Definition.*—DIOCTOPHYMIDÆ: head not particularly swollen, mouth simple without lips, but surrounded with a circle of six papillæ; cuticle transversely striated without spines; œsophagus long and narrow, slightly dilated posteriorly. Male: bursa copulatrix bell-shaped, muscular, and not supported by rays; spicule single and long. Female: tail blunt; anus terminal; vulva in the anterior part of the body; one ovary. Oviparous, eggs ellipsoidal, brown in colour, shell thick and covered by small depressions except at the poles which are homogeneous, they contain a segmented ovum at the time of deposition. Parasites of kidneys and peritoneal cavity, and rarely of liver, pleura, and heart, of mammals.

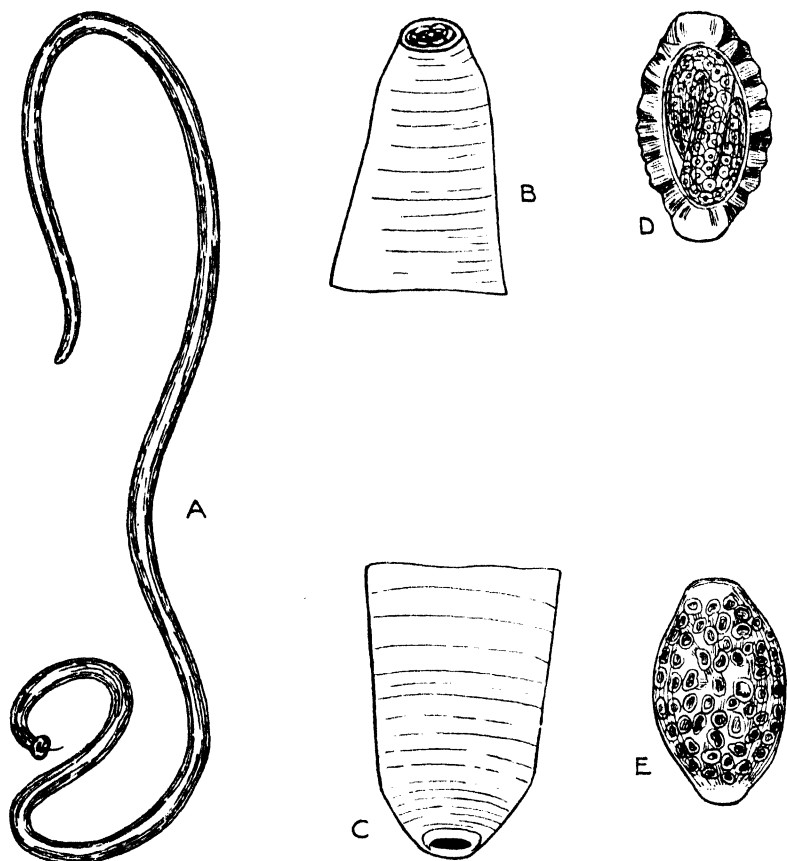


Fig. 117.—*Dioctophyme renale*. A. Male.  $\times 1$ . (After Railliet.) B. Head. C. Posterior extremity of female. (After Riley and Chandler.) D. Egg, optical section.  $\times 390$ . E. Egg, superficial view.  $\times 390$ . (After Balbiani.)

Type species: *D. renale* (Goeze, 1782). ♂ 140–400 mm., ♀ 200–1,000 mm. In many mammals.

Syn., *Ascaris renalis* Goeze, 1782.

*Ascaris visceralis* Gmelin, 1790.

*Strongylus gigas* Rudolphi, 1802.

*Eustrongylus gigas* (Rud., 1802) Dies., 1851.

Refs. 8, 107, 123, 244, 319, 360, 361, 398, 466.

Genus **EUSTRONGYLIDES** Jaegerskiöld, 1909.

**Definition.**—DIOCTOPHYMIDÆ: head not particularly swollen; mouth simple, and with twelve (or eighteen) papillæ arranged in two circles (always two lateral and four submedian in each circle);

cuticle coarsely striated, but without spines; œsophagus very long and without any particular swelling. Male: bursa closed, the form varying in different species, but always bell-shaped and muscular, without rays; spicule very long. Female: posterior extremity stumpy; anus terminal; vulva very close to anus. Parasites of glands of fore-stomach of aquatic birds.

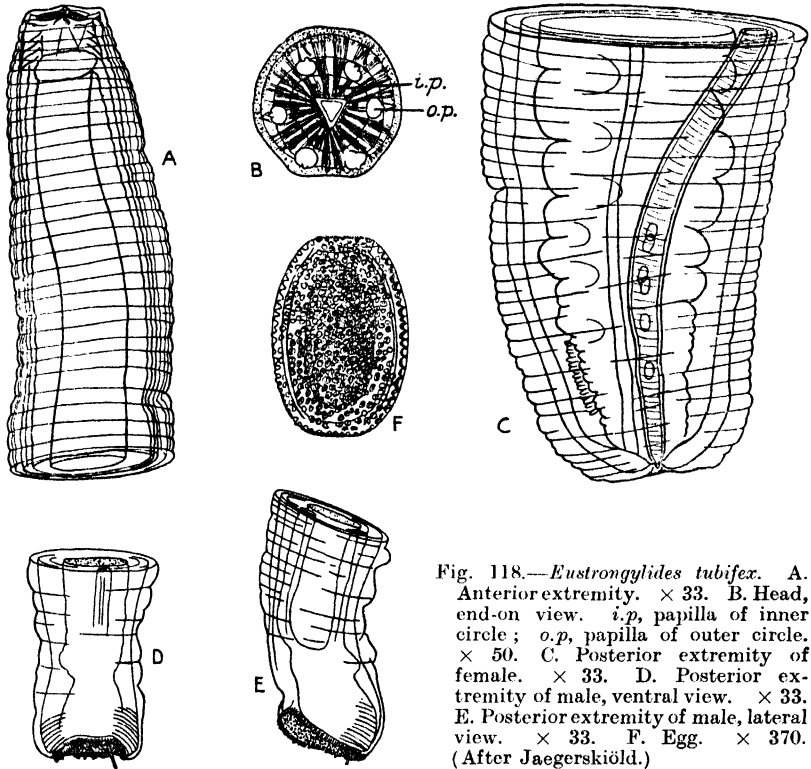


Fig. 118.—*Eustrongylides tubifex*. A. Anterior extremity.  $\times 33$ . B. Head, end-on view. *i.p.*, papilla of inner circle; *o.p.*, papilla of outer circle.  $\times 50$ . C. Posterior extremity of female.  $\times 33$ . D. Posterior extremity of male, ventral view.  $\times 33$ . E. Posterior extremity of male, lateral view.  $\times 33$ . F. Egg.  $\times 370$ . (After Jaegerskiöld.)

Type species: *E. tubifex* (Nitzsch, 1819). ♂ 34 mm., ♀ 35–44 mm. In *Colymbus* spp., *Podiceps* sp., *Alca* sp., etc.

Syn., *Strongylus tubifex* Nitzsch of Rud., 1819, restricted.

*Eustrongylus tubifex* Nitzsch of Diesing, 1851, restricted.

*Hystrichis tubifex* Nitzsch of Molin, 1861, restricted.

*Hystrichis elegans* Olfers of Railliet, 1895, in part.

Other species:

*E. africanus* Jaegerskiöld, 1909. In *Leptoptilus* sp., *Ardea* sp., *Pelecanus* sp., *Anhinga* sp.

*E. elegans* (Olfers, 1816). In *Alca* sp., *Colymbus* sp., *Harelda* sp., etc.

*E. excisus* Jaegerskiöld, 1909. In *Phalacrocorax* spp.

*E. ignotus* Jaegerskiöld, 1909. In *Ardea* sp., *Botaurus* sp.,  
? *Anhinga* sp.

*E. papillosus* (Rud., 1802). In *Nucifraga caryocatactes*.

*E. perpapillatus* Jaegerskiöld, 1909. In *Herodias* sp., *Ardea* sp.  
Refs. 244, 374, 572.

Genus **HYSTRICHIS** Dujardin, 1845.

*Definition*.—DIOCTOPHYMIDÆ: head more or less swollen, often almost spherical, mouth simple, with six relatively small papillæ in a circle (two lateral and four submedian); cuticle striated;

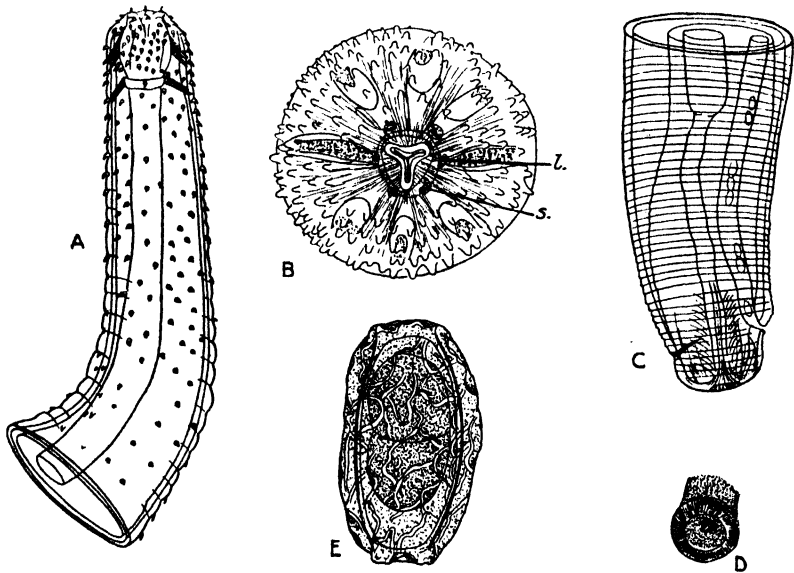


Fig. 119.—*Hystrichis acanthocephalicus*. A. Anterior extremity.  $\times 33$ . B. Head, end-on view. *l*, lateral papilla; *s*, submedian papilla.  $\times 100$ . C. Posterior extremity of female.  $\times 33$ . D. Posterior extremity of male, end-on view.  $\times 33$ . E. Egg.  $\times 370$ . (After Jaegerskiöld.)

head, usually the anterior part of the body, and sometimes the whole body, armed with spines; œsophagus long without a posterior swelling. Male: bursa more or less bell-shaped; spicule very long. Female: posterior end stumpy; anus terminal; vulva very close to anus. Parasites of the glands of the proventriculus of aquatic birds.

Type species: \**H. tricolor* Duj., 1845. ♂ ? ♀ 27 mm. In ducks.

\* Dujardin, who erected the genus *Hystrichis*, described one species *H. tricolor* from ducks, but, as the precise host is not mentioned, as the description of the species is rather vague, and as the types are no longer available, Jaegerskiöld erroneously decided to cite *H. acanthocephalicus* as the type of the genus.

Syn., *Eustrongylus tubifex* Nitzsch of Dies., 1851, in part.

*Spiroptera tricolor* Duj., of Dies., 1851.

*Hystrichis tubifex* Nitzsch of Molin, 1861, in part.

*Hystrichis tubifex* Nitzsch of Linstow, 1900, in part.

Other species :

*H. acanthocephalicus* Molin, 1861. In *Ibis* spp., *Phimosus* sp.

*H. coronatus* Molin, 1861. In *Mergus* sp.

*H. neglectus* Jaegerskiöld, 1909. In *Numenius* sp., *Querquedula* sp.

*H. orispinus* Molin, 1858. In *Ibis* sp.

*H. pachicephalus* Molin, 1861. In *Cygnus olor*.

*H. varispinosus* Jaegerskiöld, 1909. In *Mergus* sp.

*H. wedlii* Linstow, 1879. In *Fulica atra*.

Refs. 131, 244, 319, 360.

### Superfamily OXYUROIDEA Railliet, 1916.

*Definition.*—EUNEMATODA : œsophagus with a posterior bulbar enlargement : intestine without diverticula (except in *Cruziidæ*) : caudal extremity of females usually prolonged into a finely-pointed tail.

#### KEY TO FAMILIES.

1. Females with single genitalia (one ovary) . . . . . Atractidæ, p. 243.  
Females with double genitalia (two ovaries). . . . . 2
2. With intestinal diverticulum . . . . . Cruzeidæ, p. 242.  
Without intestinal diverticulum . . . . . 3
3. Males without any special development of ventral precloacal musculature . . . . . Oxyuridæ, p. 182.  
Males with precloacal musculature strongly - developed usually in the form of a sucker or pseudosucker . . . . . 4
4. Males with a definite circular precloacal sucker with a chitinous rim . . . . . Heterakidæ, p. 214.  
Males without a definite circular precloacal sucker with a chitinous rim, but with well-developed precloacal musculature usually forming an elongate sucker or pseudosucker . . . . . 5
5. Mouth with lips inconspicuous or absent ; vestibule cylindrical with three triangular teeth at its base. Parasites of warm-blooded animals . . . . . Subuluridæ, p. 225.



Mouth with three well-developed lips,  
sometimes armed; vestibule without  
teeth at its base. Parasites of cold-  
blooded animals . . . . .

Kathlaniidæ, p. 234.

6. *Oxyuroidea* insufficiently known, p. 253.

### FAMILY OXYURIDÆ COBBOLD, 1864.

*Definition.*—OXYUROIDEA: medium or small worms, mouth variable; œsophagus terminated by a bulb, often clearly separated; intestine simple without a diverticulum. Male: without a preanal sucker or any special development of precloacal muscles; spicule single, or two equal spicules; gubernaculum present or absent. Female: tail usually long and subulate; two ovaries; vulva situated generally in the anterior part of the body, but sometimes posteriorly even as far back as the region of the anus. Usually oviparous, rarely viviparous. Eggs ellipsoidal, generally rather large and asymmetrical.

#### KEY TO SUBFAMILIES.

- |   |                       |
|---|-----------------------|
| Male with a single spicule . . . . .              | 1                     |
| Males with two spicules . . . . .                 | 2                     |
| 1. With a gubernaculum . . . . .                  | Syphaciinæ, p. 194.   |
| Without a gubernaculum . . . . .                  | Oxyurinæ, p. 182.     |
| 2. Spicules equal, gubernaculum present           | Cosmocercinæ, p. 205. |
| Spicules equal, gubernaculum absent.              | Oxysomatiinæ, p. 203. |
| 3. <i>Oxyuridæ</i> of uncertain position, p. 211. |                       |

#### Subfamily OXYURINÆ Hall, 1916.

*Definition.*—OXYURIDÆ: male with a single spicule (rarely imperfectly chitinised or even absent), gubernaculum absent.

#### KEY TO GENERA.

- |   |                    |
|---|--------------------|
| Mouth a dorso-ventral slit with two<br>lateral lips . . . . . | 1                  |
| Mouth more or less circular . . . . .                         | 2                  |
| 1. Œsophagus divided into two parts . . . . .                 | Ozolaimus, p. 191. |
| Œsophagus not divided into two parts                          | Macracis, p. 191.  |
| 2. Vestibule with a chitinous armature . . . . .              | 3                  |
| Vestibule unarmed or absent . . . . .                         | 5                  |

3. Vestibule with a complicated armature of chitinous bristles (and teeth in females) . . . . . Oxyuris, p. 183.  
     Vestibule armed with three teeth . . . . . 4
4. Posterior extremity of male short and blunt, and with a row of transverse comb-like crests on ventral surface.  
     Tail of old females without circular cuticular thickenings . . . . . Dermatoxys, p. 189.  
     Posterior extremity of male long and pointed, comb-like crests absent.  
     Tail of old females with circular cuticular thickenings . . . . . Passalurus, p. 185.
5. With prominent cephalic lateral cuticular expansions . . . . . 6  
     Without prominent cephalic lateral cuticular expansions . . . . . 7
6. Tail of male truncate, spicule present Enterobius, p. 186.  
     Tail of male conical, spicule absent Aspiculuris, p. 188.
7. With a circumoral membrane supported by prominent papillæ, œsophageal cavity unusually broad . . . . . Protozoophaga, p. 190.  
     With three or six small lips, œsophageal cavity not unusually broad . . . . . 8
8. Posterior extremity blunt with a long process arising from the mid-line dorsally; spicule short and acicular; vulva posterior to middle . . . . . Thelandros, p. 192.  
     Posterior extremity of male prolonged as a subulate process, without a process arising from the mid-line dorsally; spicule short and lightly chitinized; vulva anterior to middle Pharyngodon, p. 193.

Genus **OXYURIS** Rud., 1803.

Syn., *Lepturis* Schlotthauber, 1860.

*Definition.*—**OXYURINÆ**: mouth hexagonal; cuticle without cephalic vesicular expansions or lateral flanges; vestibule short with a complicated armature of chitinous bristles, and also of teeth in the female; œsophagus muscular, swollen in front, contracted in the middle, then gradually enlarging again posteriorly into a non-separated bulb containing a valvular apparatus. Male:

posterior extremity obliquely truncated immediately behind the anus; caudal alæ supported by a pair of preanal and a pair of postanal costiform papillæ; spicule needle-shaped; gubernaculum

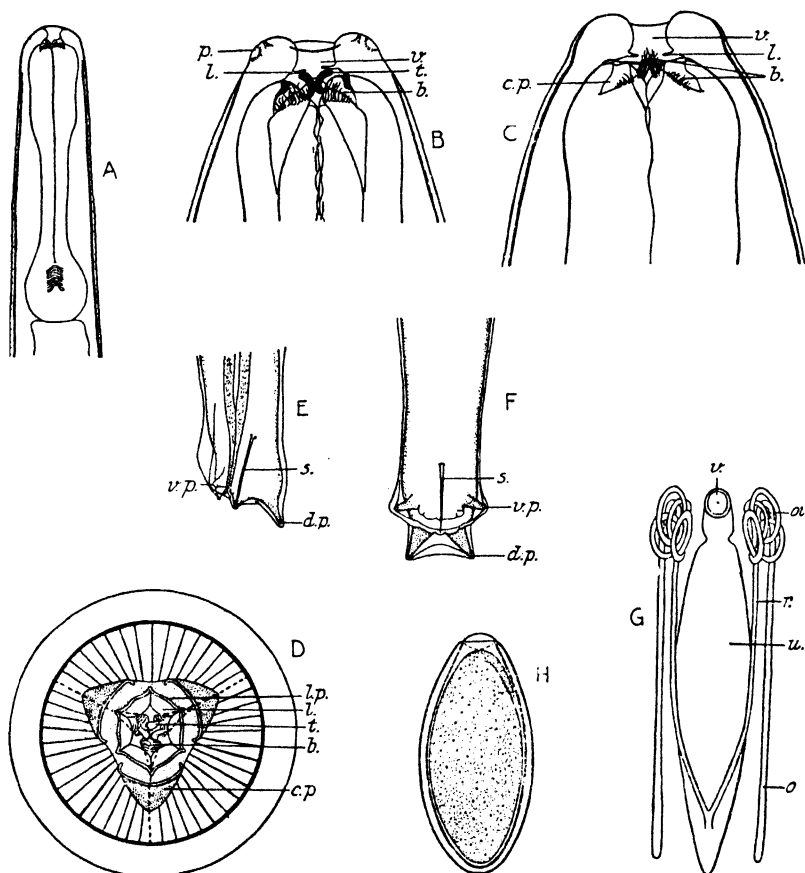


Fig. 120.—*Oxyuris equi*. A. Anterior extremity of female, dorsal view.  $\times 21$ . B. Head of female, dorsal view.  $p$ , head papillæ;  $v$ , vestibule;  $l$ , ledge;  $t$ , oesophageal tooth;  $b$ , oesophageal bristles.  $\times 40$ . C. Head of male, dorsal view.  $v$ , vestibule;  $l$ , ledge;  $b$ , oesophageal bristles;  $c.p$ , chitinized pouch.  $\times 64$ . D. Head of female, end-on view.  $l.p$ , lip;  $l$ , ledge;  $t$ , oesophageal tooth;  $b$ , oesophageal bristles;  $c.p$ , chitinized pouch.  $\times 64$ . E. Posterior extremity of male, lateral view.  $\times 42$ . F. Posterior extremity of male, ventral view.  $s$ , spicule;  $v.p$ , subventral papilla;  $d.p$ , dorsal papilla.  $\times 40$ . G. Female genitalia, diagram.  $v$ , vulva;  $o$ , ovary;  $u$ , uterus;  $r$ , receptaculum seminis;  $ov$ , oviduct. H. Egg.  $\times 280$ . (Orig.)

absent. Female: body narrows more or less suddenly behind the anus and tapers regularly to the extremity, or ends in a long whip-like prolongation, the length of which varies according to the age

of the worm ; vulva in the anterior part of the body ; vagina directed posteriorly, continuing as a single uterus which reaches to the anterior part of the tail, where it receives the short canal formed by the union of the two oviducts. Oviparous, eggs large, asymmetrical, truncate at one pole, which is closed by a lenticular operculum, and containing a tadpole-shaped larva at deposition. Parasites of equines (and ? rodents).

Type species : *O. equi* (Schrank, 1788). ♂ 9-12 mm., ♀ 40-150 mm. In equines.

Syn., *Trichocephalus equi* Schrank, 1788.

*Oxyuris curvula* Rudolphi, 1803.

*Oxyuris mastigodes* Nitzsch, 1857.

*Lepturis curvula* (Rud., 1803) Schlotthauber, 1860.

Other species :

*O. poculum* Linstow, 1904. In horses.

*O. tenuicauda* Linstow, 1901. In zebra.

? *O. triradiata* Hall, 1916. In *Ammospermophilus* sp. and *Callospermophilus* sp.

Refs. 205, 320, 325, 407, 444, 476, 479, 481, 679.

#### Genus PASSALURUS Duj., 1845.

*Definition.*—OXYURINÆ : mouth simple, with four head papillæ, cuticle without cephalic expansions, narrow lateral flanges present ; vestibule short, with three teeth at its base surrounding the opening of the œsophagus ; œsophagus club-shaped, with a posterior bulb armed with a valvular apparatus and separated from the rest by a constriction ; excretory pore behind the bulb. Male : tail very long, the body first tapers gradually behind the anus, then suddenly narrows and ends in a long fine process : narrow caudal alæ limited to the broader portion of the tail, three pairs of large contiguous sessile pericloacal papillæ, a pair of small sessile papillæ immediately behind the anus and two pedunculated papillæ at the base of the caudal point sustaining the alæ ; spicule relatively short ; gubernaculum absent. Female : tail very elongate, ending in a long thin process and moniliform in the sub-terminal part in old females ; vulva not salient, in the anterior fifth of the body ; uteri parallel. Oviparous. Parasites of rodents.

Type species : *P. ambiguus* (Rudolphi, 1819). ♂ 5 mm., ♀ 10-11 mm. In *Lepus* spp.

Syn., *Oxyuris ambigua* Rud., 1819.

Refs. 131, 205, 313, 444, 477, 525.

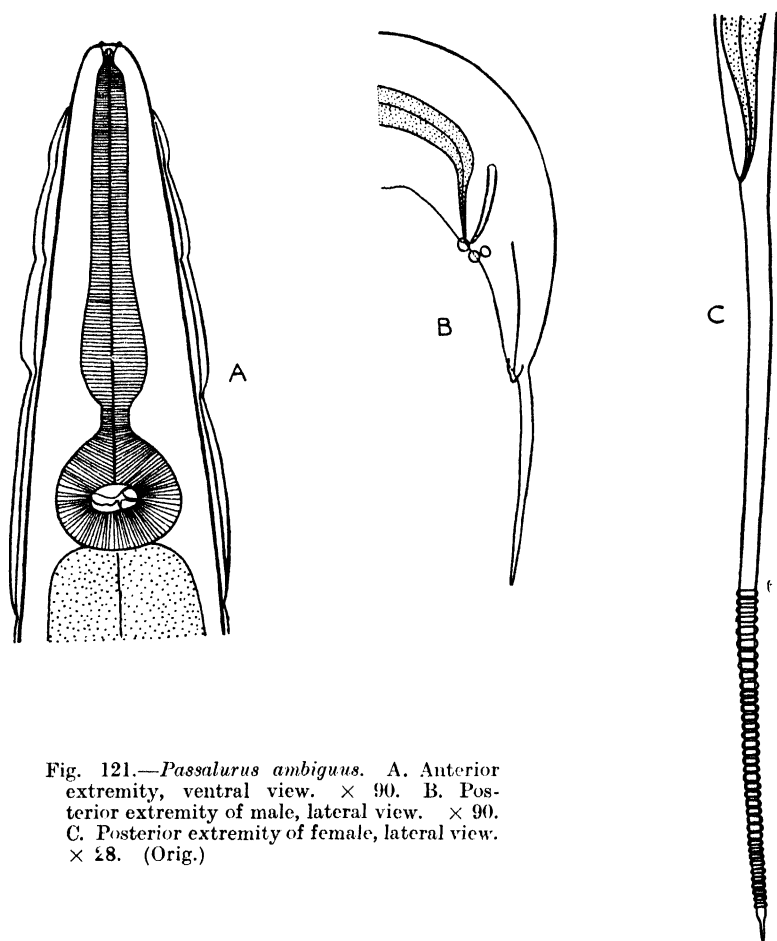


Fig. 121.—*Passalurus ambiguus*. A. Anterior extremity, ventral view.  $\times 90$ . B. Posterior extremity of male, lateral view.  $\times 90$ . C. Posterior extremity of female, lateral view.  $\times 28$ . (Orig.)

Genus **ENTEROBIUS** Leach, 1853.

Syn., *Oxyurias* Stiles, 1905.

*Fusarella* Scurat, 1916.

*Lumbriculus* Aldrovande.—Blanchard, 1889.

**Definition.**—**OXYURINÆ**: mouth with three lips; cuticle with two vesicular cephalic expansions, very narrow lateral flanges present arising shortly behind the nerve ring and extending almost to the anus in the female; vestibule absent; œsophagus club-shaped, followed by a bulb containing a valvular apparatus and separated from the rest by a constriction; excretory pore opens behind the œsophageal bulb. Male: tail sharply truncate a little behind the cloaca; caudal alæ supported in front by a

pair of pedunculated preanal papillæ and posteriorly by two large papillæ inserted at the extremity of the tail, two pairs of postanal sessile papillæ ; spicule relatively long ; gubernaculum absent. Female : tail conical and relatively short ; vulva not salient, in the anterior third of the body ; ovejector very short, forming with

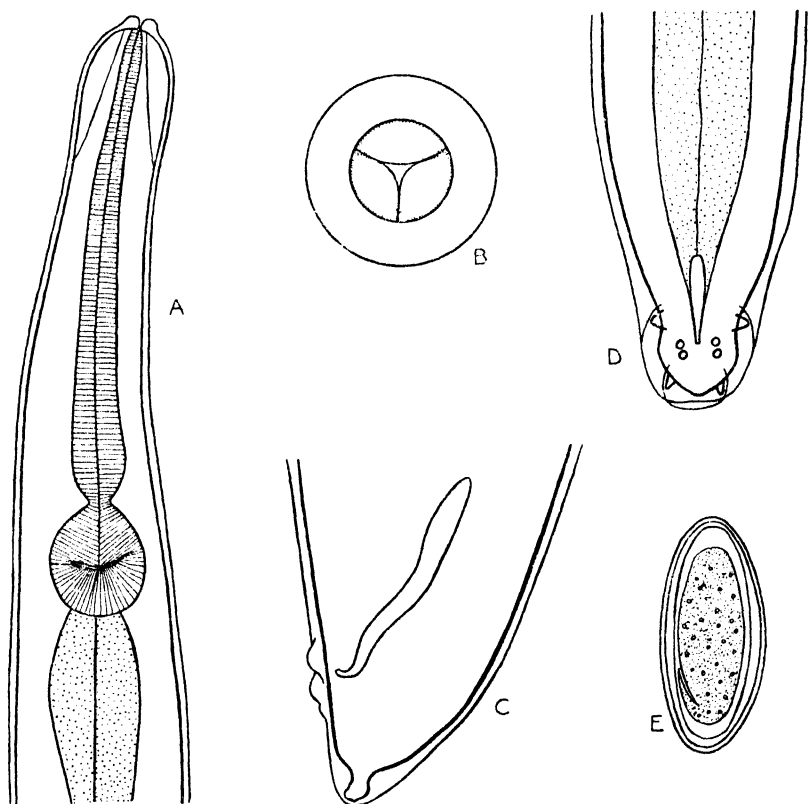


Fig. 122.—*Enterobius vermicularis*. A. Anterior extremity, ventral view.  $\times 75$ . B. Head, end-on view.  $\times 215$ . C. Posterior extremity of male, lateral view.  $\times 450$ . D. Posterior extremity of male, ventral view.  $\times 215$ . E. Egg.  $\times 430$ . (Orig.)

the first part of the vagina a pyriform reservoir ; vagina very short ; uteri parallel. Oviparous. Parasites of man and monkeys.

Type species : *E. vermicularis* (Linn., 1758). ♂ 3.5 mm.. ♀ 10 mm. In man.

Syn., *Ascaris vermicularis* Linn., 1758.

*Oxyuris vermicularis* (Linn., 1758) Bromser, 1819.

*Oxyurias vermicularis* (Linn., 1758) Stiles, 1905.

*Fusarella vermicularis* (Linn., 1758) Seurat, 1916.

Other species :

*E. anthropopetheci* (Geddoelst, 1916). In chimpanzee.

*E. bipapillatus* (Geddoelst, 1916). In monkey.

*E. minutus* (Schneider, 1866). In *Cebus* sp.

Refs. 5, 55a, 151, 444, 525, 599, 646, 679.

**Genus ASPICULURIS Schulz, 1924.**

*Definition.*—OXYURINÆ: mouth with three lips; cuticle transversely striated with broad cervical alæ terminating abruptly

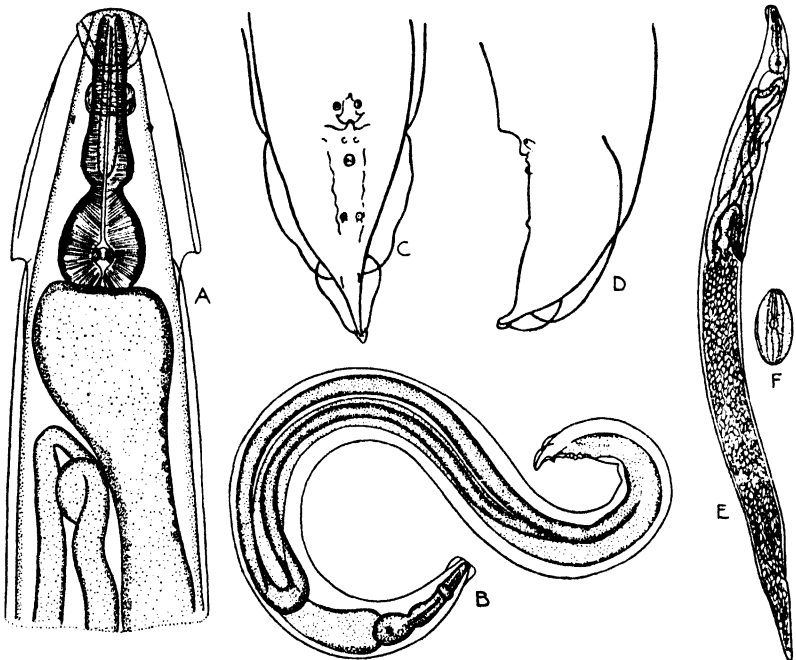


Fig. 123.—*Aspiculuris tetraptera*. A. Anterior extremity, ventral view. B. Male. C. Tail of male, ventral view. D. Tail of male, lateral view. E. Female, lateral view. F. Egg. (After Schulz.)

behind at the level of the œsophageal bulb, from which level narrow lateral flanges run to the posterior end of the worm; œsophagus somewhat club-shaped and terminating posteriorly in a well-developed bulb containing a valvular apparatus and separated from the rest of the œsophagus by a constriction. Male: tail conical, with caudal alæ divided transversely into three portions of which the anterior is the largest; with one pair of preanal papillæ and several pairs of postanal papillæ; spicule and gubernaculum apparently absent. Female: tail conical;

vulva in front of the middle of the body. Oviparous. Parasites of rodents.

Type species: *A. tetraptera* (Nitzsch, 1821). ♂ 2-2.6 mm., ♀ 2.6-4.75 mm. In *Mus musculus*, *Cricetus* spp., etc.

Syn., *Ascaris tetraptera* Nitzsch, 1821.

Refs. 215, 311, 374, 478a, 481a.

Genus **DERMATOXYS** Schneider, 1866.

*Definition.*—**OXYURINÆ**: mouth with three lips, each bearing two papillæ; cuticle with cervical alæ extending from the head to

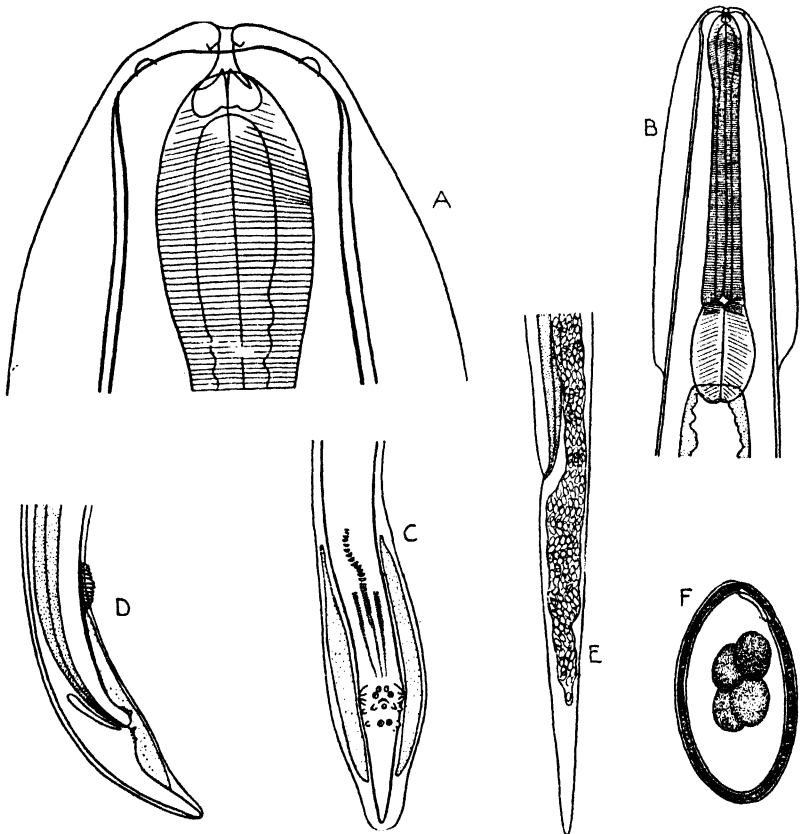


Fig. 124.—*Dermatoxys veligera*. A. Head, ventral view.  $\times 160$ . B. Anterior extremity, ventral view.  $\times 35$ . C. Posterior extremity of male, ventral view.  $\times 35$ . D. Posterior extremity of male, lateral view.  $\times 35$ . E. Posterior extremity of female, lateral view.  $\times 35$ . F. Egg.  $\times 250$ . (Orig.)

about the end of the œsophagus; vestibule short, provided with three teeth; œsophagus dilated into a bulb-like swelling posteriorly,



with or without a valvular apparatus, the bulb may or may not be separated from the rest by a constriction. Male : tail short and ends in a blunt point, with a curving longitudinal row of transverse comb-like crests on the ventral surface in front of the cloaca ; caudal alæ very long and well-developed, with a number of large papillæ close to the anus and about two pairs of postanal papillæ ; spicule very short ; gubernaculum absent. Female : tail long and gradually tapering ; vulva in front of the middle of the body ; ovaries massive, deeply coloured, in the anterior part of the body, and communicating by narrow oviducts with the long receptacula which unite in the vicinity of the anus to form the single uterus which extends anteriorly to the vagina. Oviparous, eggs asym-

metrical with thick shells and a plug at one pole. Parasites of rodents.

Type species : *D. veligera* (Rudolphi, 1819). ♂ 8 mm., ♀ 16 mm. In *Lepus* spp., *Sylvilagus* spp.

Syn., *Ascaris veligera* Rudolphi, 1819.

Other species :

*D. getula* Seurat, 1915. In *Xerus getulus*.

? *D. polyoon* (Linstow, 1909). In *Xerus setosus*.

Refs. 205, 444, 477, 480, 515, 518.

Genus **PROTOZOOPHAGA** Travassos, 1923.

*Definition.* — OXYURINÆ : exhibiting great sexual dimorphism, mouth large with four prominent papillæ in the male and six in the female supporting a circumoral membrane without definite lips ; œsophagus cylindrical with a large cavity, and followed by a bulb containing a valvular ap-

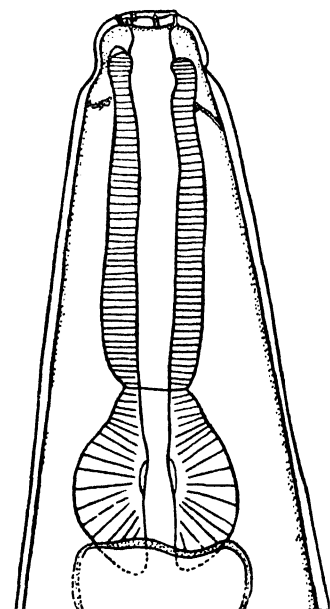


Fig. 125. — *Protozoophaga obesa*.  
Anterior extremity of female.  
× 40. (After Travassos.)

paratus and separated from the rest by a constriction. Male : tail conical and alate with a terminal conical process, two pairs of large lateral papillæ, one adanal and the other postanal ; spicule single, slightly chitinated ; gubernaculum absent. Female : tail conical in young specimens and long and subulate in gravid worms ; vulva anterior, ovejector large. Oviparous. Parasites of rodents.

Type species : *P. obesa* (Diesing, 1851). ♂ 15 mm., ♀ 40 mm.  
In *Hydrochaërus capibara*.

Syn., *Oxyuris obesa* Diesing, 1851.

Refs. 123, 205, 480, 646.

Genus **OZOLAIMUS** Duj., 1845.

*Definition*.—**OXYURINÆ** : mouth dorso-ventral with two lateral lips ; œsophagus very long and composed of two sections in tandem of which the first is shorter and thicker and dilates into a fusiform swelling before entering the second, which is thin and almost filiform and is followed by a bulb ; the intestine is dilated at its origin. Male : posterior extremity obliquely truncate, with a short blunt tail ; spicule long and straight. Female : tail straight and gradually attenuating ; anus near the extremity ; vulva salient and situated in the posterior fourth of the body. Parasites of reptiles.

Type species : *O. megatyphlon* (Rud., 1819).  
♂ 5 mm., ♀ 7–8 mm. In *Iguana tuberculata*.

Syn., *Ascaris megatyphlon* Rud., 1819.

Other species : *O. cirratus* (Linstow, 1906).  
In *Iguana tuberculata*.

Refs. 131, 436, 444, 477, 480.



Fig. 126. — *Ozolaimus megatyphlon*. Posterior extremity of male, lateral view.  $\times 90$ . (After Schneider.)

Genus **MACRACIS** Geddoelst, 1916.

*Definition*.—**OXYURINÆ** : closely resembling *Ozolaimus*, mouth dorso-ventral, two lateral lips ; œsophagus very long (nearly half the length of the worm) and narrow, not divided into anterior and posterior portions, but ending in a well-marked bulb. Male : posterior extremity obliquely truncate, with a short blunt tail ; spicule long and straight. Female : tail short and blunt ; vulva in the posterior third of the body. Parasites of reptiles.

Type species : *Macracis monhystera* (Linstow, 1902). ♂ 7.1 mm., ♀ 7.6 mm. In *Iguana cornuta*.

Syn., *Oxyuris monhystera* Linstow, 1902.

Geddoelst erected this genus for *Oxy. monhystera* on the assumption that Linstow's statement, that the female genitalia were single,

is correct, but it was later shown (Rauther, 1918) that contrary to the statement of Linstow the female genitalia are double. The

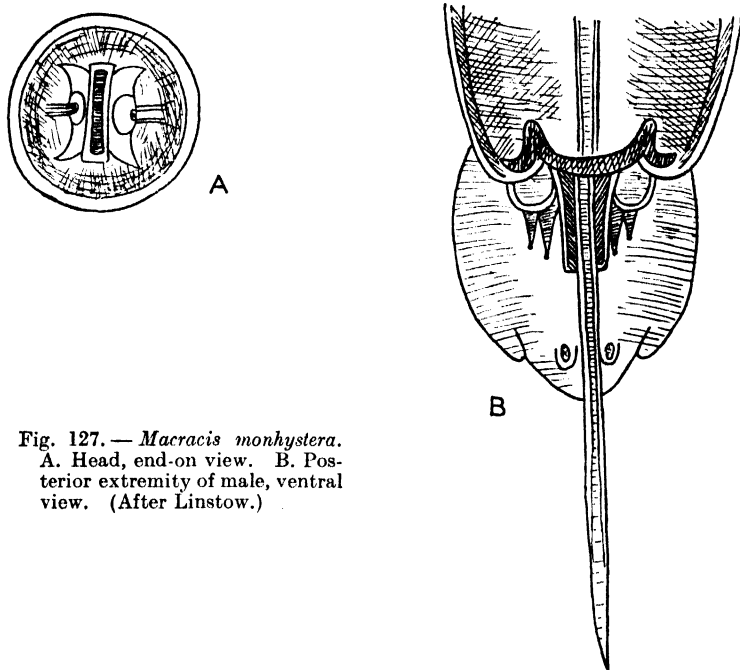


Fig. 127. — *Macracis monhystera*.  
A. Head, end-on view. B. Posterior extremity of male, ventral view. (After Linstow.)

chief difference between *Macracis* and *Ozolaimus* appears to lie in the structure of the oesophagus.

Refs. 151, 155, 323, 464.

**Genus THELANDROS Wedl. 1862.**

*Definition*.—OXYURINÆ: mouth bounded by six (three bilobed) lips, buccal margin carrying six sessile papillæ corresponding to the lips; lateral flanges sometimes present; vestibule short; oesophagus with a posterior bulb. Male: posterior extremity truncate; caudal alæ absent; one pair of large pedunculated preanal papillæ and two pairs of postanal papillæ of which the more posterior pair is situated on a process arising from the mid-line dorsally in front of the anus and prolonged posteriorly as a kind of short conical tail; spicule short, acicular; gubernaculum absent. Female: vulva behind the middle of the body with slightly projecting lips. Oviparous. Parasites of reptiles.

Type species: *T. alatus* Wedl, 1862. ♂ 2.5–4 mm., ♀ 5–9 mm. In *Uromastix* spp.

Syn., *Oxyuris uromasticola* Galeb, 1889.

Other species :

*T. bulbosus* (Linstow, 1899). In *Chalcides* sp., *Scincus* sp.

*T. cinctus* (Linstow, 1897). In *Agama stellio*.

*T. echinatus* (Rud., 1819). In *Gecko*, etc.

*T. micipsæ* Seurat, 1917. In *Chalcides micipsæ*.

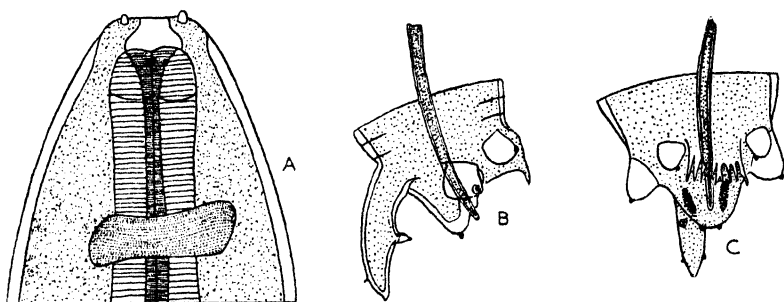


Fig. 128.—*Thelandros alatus*. A. Head. B. Posterior extremity of male, lateral view. C. Posterior extremity of male, ventral view. (After Seurat.)

*T. numidicus* Seurat, 1918. In tortoises.

*T. scleratus* Travassos, 1923. In *Tropidurus* spp.

Refs. 34, 149, 486, 524, 541, 552, 647, 664.

#### Genus PHARYNGODON Diesing, 1861.

*Definition*.—*OXYURINÆ*: mouth with three small lips; cuticle with or without lateral flanges; vestibule absent; oesophagus with a posterior globular bulb containing a valvular apparatus and separated from the rest by a slight constriction; excretory pore behind the oesophageal bulb. Posterior extremity of the body in both sexes obliquely truncate ventrally at the level of the cloaca, rounded and prolonged as a long subulate tail, provided with spines or smooth. Male: with caudal alæ which may be continuous with the lateral flanges; one pair of preanal and two of pedunculated postanal papillæ, the cloaca is at the end of the body just before commencement of subulate tail; spicule imperfectly chitinized or even absent. Female: anus near the end of the body shortly before the commencement of the subulate tail; vulva near the middle of the body or anterior to this. Oviparous, eggs very elongate and oval. Parasites of reptiles, and ? amphibia.

Type species: *P. spinicauda* (Duj., 1845). ♂ 3 mm., ♀ 3–5 mm. In *Lacerta muralis*, *Tejus* sp., *Triton* sp.

Syn., *Oxyuris spinicauda* Duj., 1845.

*Ascaris acanthura* Diesing, 1851.

*Pharyngodon acanthurus* Diesing, 1861, in part.

## Other species :

*P. auziensis* Seurat, 1917. In *Scincus* sp., *Cerastes* sp.

*P. extenuatus* (Rud., 1819). In *Lacerta* sp.

Syn., *P. acanthurus* Dies., 1861, in part.

*P. hindlei* Thapar, 1925. In *Tiligua senicordis*.

*P. inermicauda* Baylis, 1923. In *Tarentola annularis*.

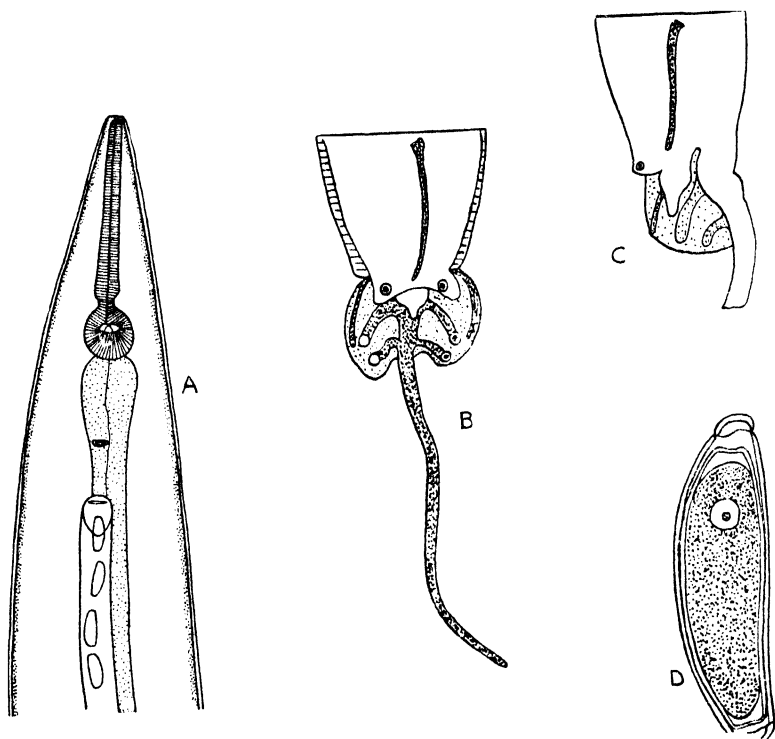


Fig. 129.—*Pharyngodon spinicauda*. A. Anterior extremity of female.  $\times 56$ . (Orig.) B. Posterior extremity of male, ventral view.  $\times 276$ . C. Posterior extremity of male, lateral view.  $\times 276$ . D. Egg.  $\times 276$ . (After Seurat.)

*P. lævicauda* (Seurat, 1914). In *Scincus* sp., etc.

*P. megalocerca* (Skrjabin, 1916). In *Geckonidæ*.

*P. mamillatus* (Linstow, 1897). In *Plestiodon* sp., etc.

*P. tectipenis* Gedoelst, 1919. In a grey lizard.

Refs. 34, 123, 125, 131, 153, 444, 508, 541, 573, 613c.

Subfamily SYPHACIINÆ Railliet, 1916.

*Definition*.—OXYURIDÆ; males with a single spicule, and a gubernaculum.

## KEY TO GENERA.

- Vulva posterior to middle of body . . . 1  
 Vulva anterior to middle of body . . . 4
1. Posterior extremity of male short and truncate . . . . . Tachygonetria, p. 198.  
 Posterior extremity of male prolonged dorsally into a conical process . . . 2
2. Male with broad caudal alæ . . . Alæuris, p. 203.  
 Male with caudal alæ very narrow or absent . . . . . 3
3. With teeth and spherical knobs at anterior end of œsophagus ; with only one uterus . . . . . Veversia, p. 201.  
 Without teeth and knobs at anterior end of œsophagus ; with two uteri . . . Mehdiella, p. 200.
4. Posterior extremity of male rounded with a short sharp spike . . . Trypanoxyuris, p. 198.  
 Posterior extremity of male prolonged as a subulate process . . . . . 5
5. Male with cuticular "mamelons" . . . Syphacia, p. 195.  
 Male without cuticular "mamelons". . . Wellcomeia, p. 196.

Genus *SYPHACIA* Seurat, 1916.

*Definition*.—*SYPHACIINÆ*: mouth bounded by three lips ; small cervical alæ present ; vestibule absent ; œsophagus club-shaped with a posterior bulb containing a valvular apparatus and separated from the rest by a constriction. Male: with two or three cuticular "mamelons" on the ventral surface ; posterior extremity bent ventrally, body cut away ventrally behind the cloaca and then suddenly narrows and ends in a long pointed tail ; narrow caudal alæ present limited to the first part of the tail ; two pairs of preanal papillæ and one pair of postanal pedunculated papillæ supporting the alæ behind ; spicule relatively long and very obvious ; gubernaculum directed transversely. Female: tail long and pointed ; vulva in the anterior region of the body, behind the excretory pore, and communicating by a short vagina, frequently protruded, with a cuticle-lined ovejector remarkable for the thickness of its muscle coat ; uterus single, very long ; receptacula seminis parallel and narrow ; two ovaries. Oviparous. Parasites of rodents and man.

Type species : *S. obvelata* (Rud., 1802). ♂ 1.3 mm., ♀ 3.5–5.7 mm. In mice, rats, and man.

Syn., *Ascaris obvelata* Rud., 1802.

*Oxyuris stroma* Linstow, 1884.

Other species :

*S. bonnei* Thiel, 1925. In *Mycetes seniculus*.

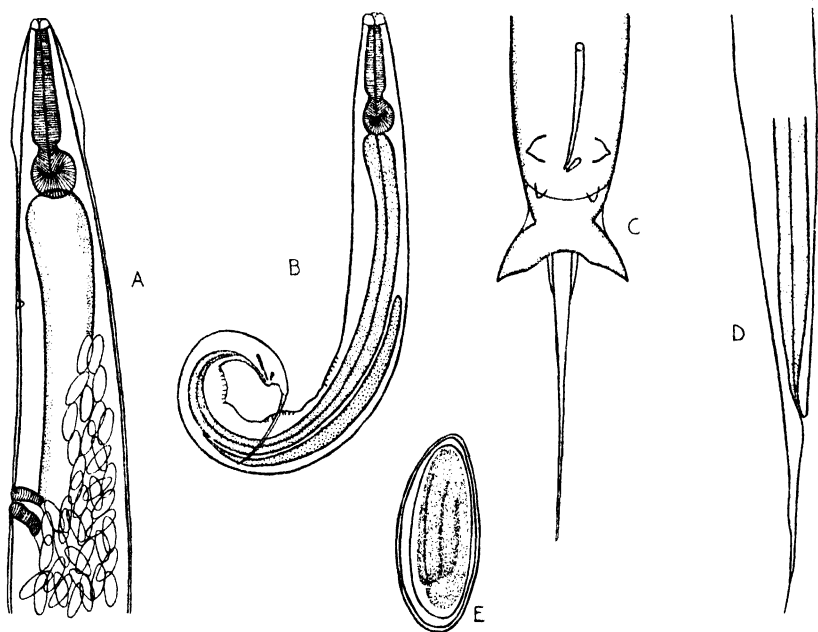


Fig. 130.—*Syphacia obvelata*. A. Anterior extremity of female, lateral view.  $\times 330$ . B. Male, lateral view.  $\times 75$ . C. Posterior extremity of male, ventral view.  $\times 330$ . D. Posterior extremity of female, lateral view.  $\times 215$ . E. Egg.  $\times 150$ . (Orig.)

*S. pallaryi* (Seurat, 1915). In *Xerus getulus*.

*S. stossichi* (Setti, 1897). In *Hystrix cristata*.

Refs. 205, 444, 465, 481a, 482, 515, 525, 616a, 646.

Genus **WELLCOMIA** Sambon, 1907.

*Definition*.—**SYPHACHIINÆ**: mouth with three broad lips; cervical alæ may or may not be present; œsophagus club-shaped followed by a spherical bulb with a valvular apparatus. Male: without cuticular “mamelons” on the ventral surface; posterior extremity tightly coiled spirally, tail narrows suddenly a little behind the cloaca and ends in a long pointed process; just before the narrowing there is a pair of highly-developed postanal papillæ supporting membranous expansions stretching from them to the

adanal papillæ; spicule single, feebly chitinized; gubernaculum flask-shaped. Female: tail long and tapering gradually to a point, and sometimes with cuticular markings; vulva in front of the

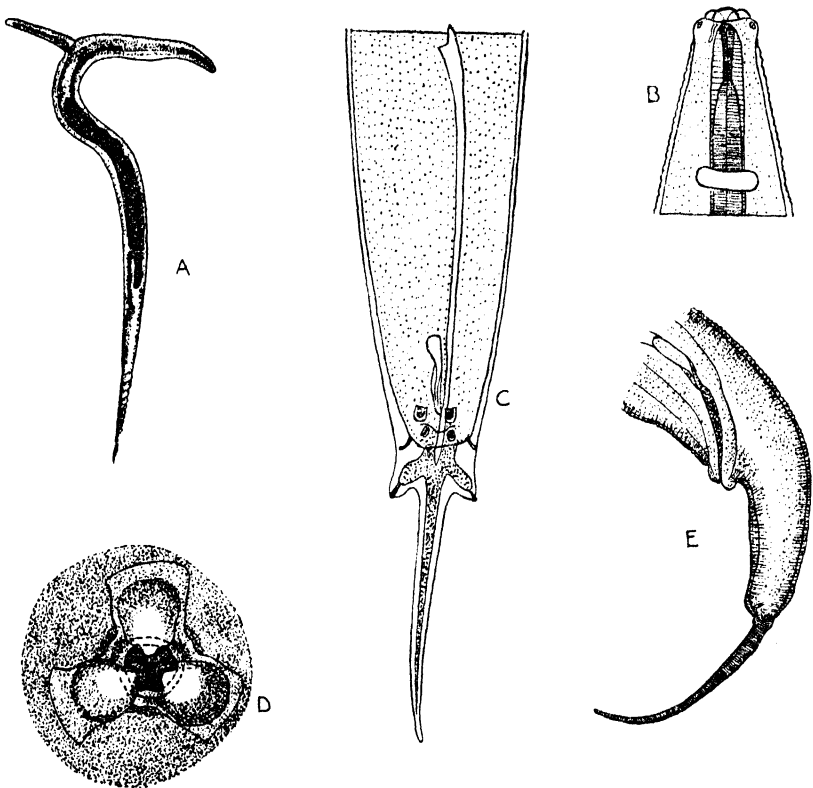


Fig. 131.—*Wellcomia mitchelli*. A. Female, lateral view. (After Sambon.) *W. hilgerti*. B. Anterior extremity, ventral view.  $\times 175$ . C. Posterior extremity of male, ventral view.  $\times 175$ . (After Seurat.) *W. evoluta*. D. Head, end-on view.  $\times 225$ . E. Posterior extremity of female. (After Hall.)

middle of the body, and through it the vagina is extruded. Oviparous. Parasites of rodents.

Type species: *W. mitchelli* Sambon, 1907. ♂ 12 mm., ♀ 15 mm.  
In Cape jumping hare.

Other species:

*W. decorata* Travassos, 1923. In *Cœndu brandti*.

*W. evoluta* (Linstow, 1899). In *Acanthion brachyura*, etc.

*W. hilgerti* (Seurat, 1914). In *Ctenodactylus gundi*.

*W. samboni* Baylis, 1922. In the hairy porcupine.

Refs. 31, 205, 318, 444, 478, 519, 524, 646.



Genus **TRYPANOXYURIS** Vevers, 1923.

*Definition*.—SYPHACINÆ: mouth with two inconspicuous lips; small cervical alæ present; vestibule absent; œsophagus with a very distinct bulb. Male: posterior end terminates abruptly in a rounded extremity in the centre of which is a short sharp spike; there are five pairs of papillæ—two preanal and three postanal, the larger pair of preanals carry out a cuticular expansion which surrounds the tail; spicule relatively short and straight; gubernaculum annular. Female: tail tapers gradually and ends in a

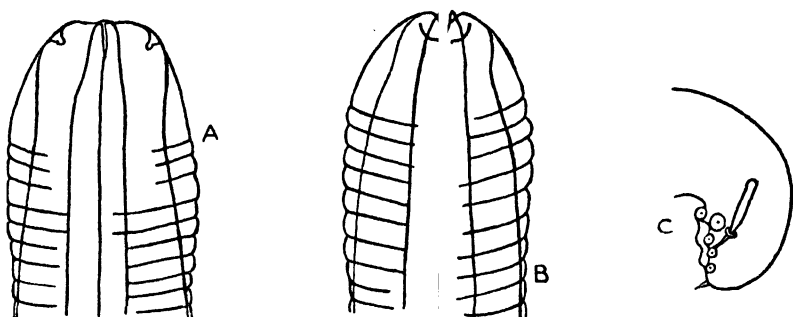


Fig. 132.—*Trypanoxyuris trypanuris*. A. Head, dorsal view.  $\times 160$ . B. Head, lateral view.  $\times 160$ . C. Posterior extremity of male, lateral view.  $\times 160$ . (After Vevers.)

blunt point; vulva near the junction of the anterior and middle thirds of the body. Oviparous. Parasites of monkeys.

Type species: *T. trypanuris* Vevers, 1923. ♂ 2 mm., ♀ 6.7 mm. In *Pithecia monachus*, "Hura monkey."

Ref. 657.

Genus **TACHYGONETRIA** Wedl, 1862.

Syn., *Paracis* Railliet and Henry, 1916.

*Definition*.—SYPHACINÆ: mouth surrounded by six small lips; cuticle finely striated transversely and sometimes provided with delicate hairs; lateral flanges absent; vestibule short; œsophagus usually very long and followed by a bulb with a valvular apparatus. Male: posterior extremity sharply cut away ventrally at the level of the cloaca, and terminates as a short truncated tail having a trapezoidal form, bearing a pair of lateral papillæ at the two angles of the truncated extremity; in addition there are three pairs of papillæ grouped around the cloaca—one pair of preanal, one of voluminous latero-ventral postanal and one of small adanal papillæ; spicule short and of variable form; gubernaculum annular.

naeculum in the form of an open V. Female: tail conical and relatively short; vulva behind the middle of the body; uteri parallel. Usually oviparous, the eggs being few in number and segmented at deposition; rarely viviparous. Parasites of cæcum of herbivorous reptiles.

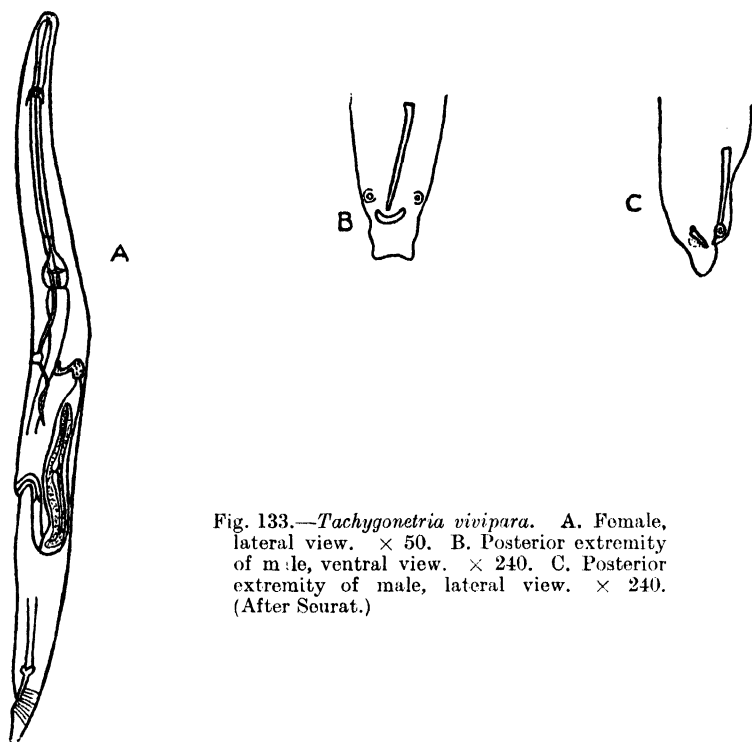


Fig. 133.—*Tachygonetria vivipara*. A. Female, lateral view.  $\times 50$ . B. Posterior extremity of male, ventral view.  $\times 240$ . C. Posterior extremity of male, lateral view.  $\times 240$ . (After Seurat.)

Type species: *T. vivipara* Wedl, 1862. ♂ 1.5 mm., ♀ 2–2.5 mm.  
In *Uromastix* spp.

Other species:

*T. conica* (Drasche, 1884). In *Testudo græca*, etc.

*T. dentata* (Drasche, 1884). In *Testudo græca*, etc.

*T. jugurthæ* Seurat, 1918. In tortoises.

*T. lambdiensis* Seurat, 1918. In tortoises.

*T. longicollis* (Schneider, 1866). In *Testudo græca*, etc.

Syn., *Paracis longicollis* (Schneider, 1866) Railliet and Henry, 1916.

*T. macrolaimus* (Linstow, 1899). In *Testudo pardalis*.

*T. massinissæ* Seurat, 1918. In tortoises.

*T. microlaimus* (Linstow, 1899). In *Testudo pardalis*.

*T. nicollei* Seurat, 1918. In tortoises.

*T. numidica* Seurat, 1918. In tortoises.

*T. paronai* (Linstow, 1893). In *Macroscincus coctæi*.

*T. pusilla* Seurat, 1918. In tortoises.

Syn., *Oxyuris longicollis* Drasche, 1883, not Schneider, 1866.

*T. setosa* Seurat, 1918. In tortoises.

*T. stylosa* Thapar, 1925. In *Testudo ibera*.

*T. weissii* Seurat, 1918. In tortoises.

Refs. 34, 444, 480, 486, 524, 552, 613c, 664.

Genus **MEHDIELLA** Seurat, 1918.

*Definition*.—SYPHACINÆ: mouth surrounded by three lips which may be bilobed; cuticle thick, transversely striated, with or without bristles; vestibule short, œsophagus cylindrical

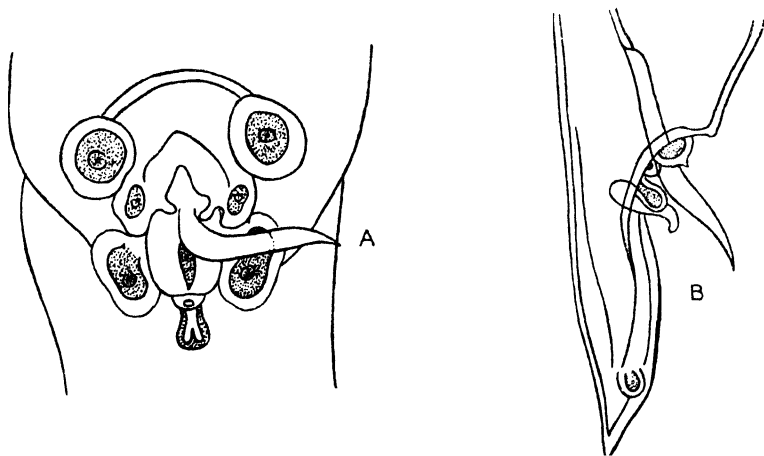


Fig. 134.—*Mehdiella microstoma*. A. Cloacal region of male, ventral view.  $\times 528$ . B. Posterior extremity of male, lateral view.  $\times 220$ . (After Drasche.)

followed by a bulb. Male: body sharply cut away ventrally at the level of the cloaca, terminating dorsally as a long conical tail bearing a pair of voluminous papillæ towards its posterior third; in addition there are three pairs of pericloacal papillæ—one pair of preanal, and one pair of latero-ventral voluminous papillæ, and one pair of small adanal papillæ; caudal alæ narrow; spicule short and acicular; gubernaculum in the form of an open V. Female: tail conical and relatively short; vulva a little distance behind the middle of the body; with two uteri. Oviparous, eggs large, numerous, ellipsoidal and segmented at deposition. Parasites of herbivorous reptiles.

Type species : *M. microstoma* (Drasche, 1884). ♂ 5.4 mm.  
♀ 7.6 mm. In *Testudo græca*, etc.

Syn., *Oxyuris microstoma* Drasche, 1884.

*Oxyuris robusta* Drasche, 1884.

*Oxyuris draschei* Stossich, 1898.

Other species :

*M. uncinata* (Drasche, 1884). In *Testudo græca*.

Syn., *Oxyuris uncinata* Drasche, 1884.

*Oxyuris inflata* Drasche, 1884, not Linstow, 1883.

*Oxyuris albanica* Stossich, 1898.

Refs. 34, 129, 552.

**Genus VEVERSIA Thapar, 1925.**

*Definition*.—SYPHACHINÆ : mouth surrounded by three conical lips ; buccal cavity small and armed in its depth with small teeth,

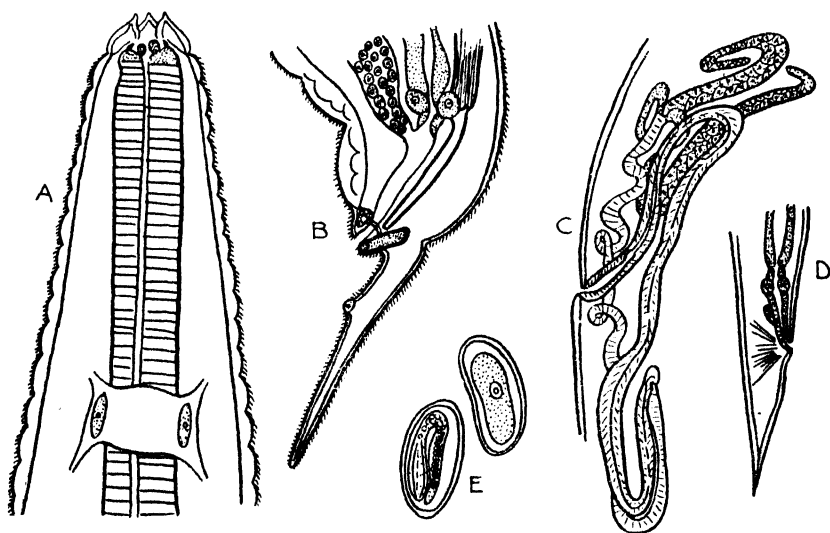


Fig. 135.—*Veverisia tuberculata*. A. Anterior extremity, ventral view.  $\times 320$ . B. Posterior extremity of male, lateral view.  $\times 215$ . C. Female genitalia.  $\times 46$ . D. Tail of female, lateral view.  $\times 46$ . E. Eggs.  $\times 135$ . (After Thapar.)

and granular knob-like outgrowths arising from the anterior end of the œsophagus ; cuticle thick, transversely striated and furnished in both sexes with thick hairs ; lateral areas well-developed, and each bears a pair of thick flanges running parallel to each other along the entire length of the body ; œsophagus elongated, with a posterior bulb, provided with a denticular

apparatus, and separated by a constriction from the rest of the œsophagus ; excretory pore behind the œsophageal bulb. Male : body cut away ventrally behind the cloaca and ends in a long narrow tail ; in front of the tail the cuticle is inflated to form lateral alæ, but caudal alæ are absent ; with one pair of preanal papillæ and two of postanal, one of which is on the tail ; spicule relatively long, stout, and slightly curved ; gubernaculum present. Female : tail elongated, conical, and pointed ; vulva behind the middle of the body ; ovejector very long ; uterus single, dividing anteriorly into two short oviducts leading into the ovaries which are massive and club-shaped. Oviparous, eggs bean-shaped and embryonated *in utero*. Parasites of reptiles.

Type species : *V. tuberculata* (Linstow, 1904). ♂ 2–3 mm., ♀ 3–4 mm. In *Trachysaurus rugosus*.

Syn., *Oxyuris tuberculata* Linstow, 1904.

Refs. 326, 613c.

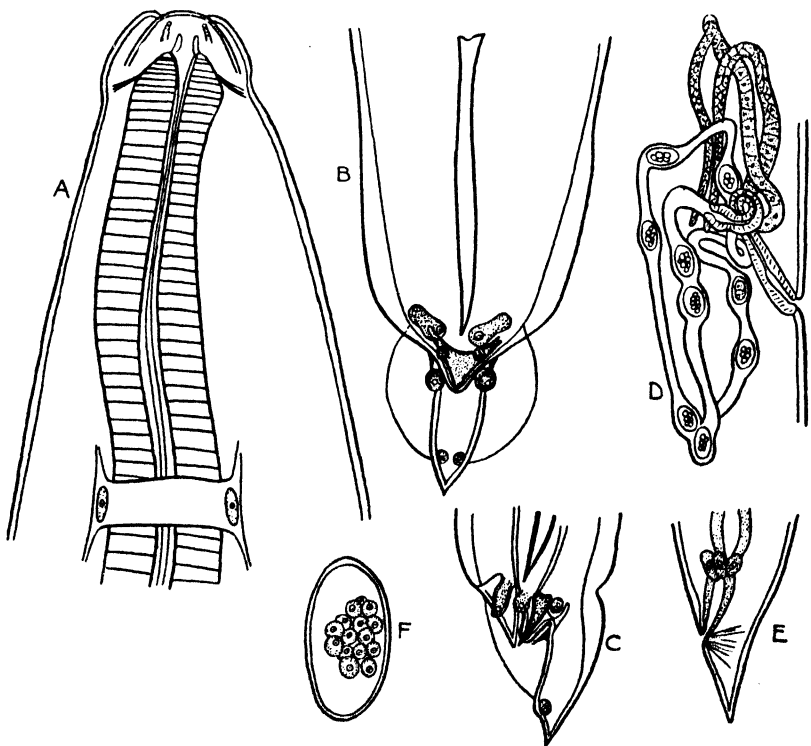


Fig. 136.—*Alæuris alæuris*. A. Anterior extremity, dorsal view.  $\times 320$ . B. Posterior extremity of male, ventral view.  $\times 215$ . C. Posterior extremity of male, lateral view.  $\times 215$ . D. Female genitalia.  $\times 29$ . E. Tail of female.  $\times 46$ . F. Egg.  $\times 135$ . (After Thapar.)

Genus **ALÆURIS** Thapar, 1925.

*Definition.*—SYPHACIINÆ: mouth with three lips; cuticle with lateral flanges; œsophagus elongated and provided posteriorly with a bulb containing a valvular apparatus and separated from the rest of the œsophagus by a constriction. Male: body cut away ventrally behind the cloaca and ending as a conical tail provided with broad caudal alæ, with three pairs of circumanal papillæ and a pair of papillæ near the tip of the tail; spicule very long, slender, and acicular; gubernaculum present and V-shaped. Female: tail short and conical; vulva behind the middle of the body; ovejector long; ovaries club-shaped. Oviparous. Parasites of reptiles.

Type species: *A. alæuris* Thapar, 1925. ♂ 4 mm., ♀ 4.5–6 mm. In *Testudo ibera*.

Other species: *A. iguanæ* Thapar, 1925. In *Iguana tuberculata*. Ref. 613c.

Subfamily **OXYSOMATIINÆ** Railliet, 1916.

*Definition.*—OXYURIDÆ: Male: with two equal spicules; gubernaculum absent.

## KEY TO GENERA.

Vestibulum present; spicules short . . . . . Probstmayria, p. 204.  
 Vestibulum absent; spicules long and  
 winged . . . . . Oxsomatium, p. 203

Genus **OXYSOMATIUM** Railliet and Henry, 1913.

Syn., *Oxysoma* Schneider, 1866, in part.

*Definition.*—OXYSOMATIINÆ: mouth with three small lips and ten head papillæ, the submedian being double; lateral flanges absent; vestibule absent; œsophagus long with a posterior bulb. Male: tail tapering rapidly behind the anus to end in a sharp point; caudal alæ absent; three pairs of preanal, three of circumanal, and four of postanal papillæ; spicules long, equal, and winged; gubernaculum absent. Female: vulva behind the middle of the body. Parasites of amphibia.

Type species: *Oxsomatium longespiculum* Railliet and Henry, 1916. ♂ 3 mm., ♀ 5.5 mm. In frogs.

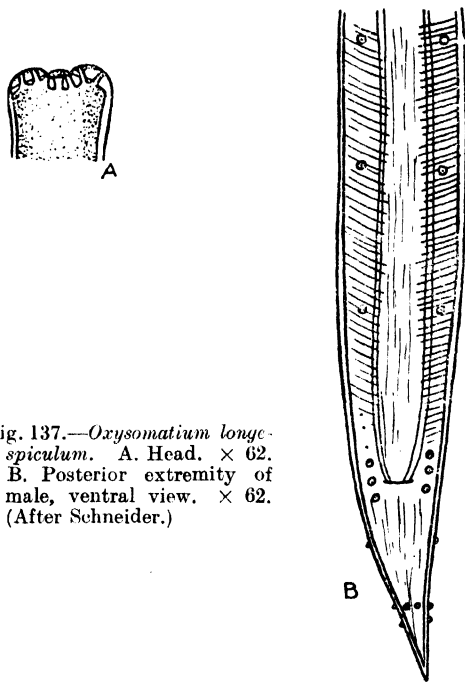


Fig. 137.—*Oxyssomatium longispiculum*. A. Head.  $\times 62$ .  
B. Posterior extremity of male, ventral view.  $\times 62$ .  
(After Schneider.)

Syn., *Oxyssoma brevicaudatum* Schneider, 1866, not *Fusaria brevicaudata* Zeder, 1800.

Refs. 405, 444, 445, 480, 681.

**Genus PROBSTMAYRIA Ransom, 1907.**

*Definition*.—OXYSSOMATIINÆ: mouth small, surrounded by six insignificant lips; cuticle without lateral flanges; a cylindrical vestibule present; œsophagus consisting of two tandem parts separated by a transverse groove, the posterior part terminates in a bulb furnished with a valvular apparatus. The tail in both sexes is long and pointed, the anus lying at the commencement of the tail some distance from the posterior extremity. Male: posterior extremity curved, but not spirally rolled; caudal alæ absent; about six pairs of postanal papillæ; spicules almost equal; gubernaculum absent. Female: vulva near the middle of the body; the two uteri contain eggs and free embryos. Viviparous. Parasites of equines.

Type species: *P. vivipara* (Probstmayr, 1865). ♂ 2.7 mm., ♀ 2.7–3 mm. In intestine of equines.

Syn., *Oxyuris vivipara* Probstmayr, 1865.

Refs. 226, 456.

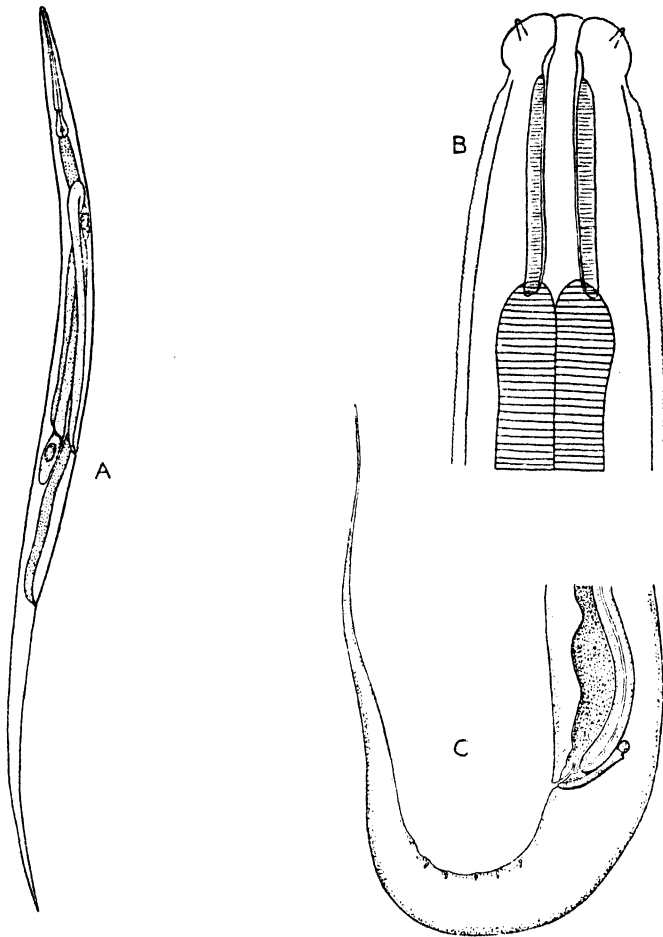


Fig. 138.—*Probstmayria vivipara*. A. Female, lateral view.  $\times 45$ . B. Anterior extremity.  $\times 900$ . (Orig.) C. Posterior extremity of male, lateral view. (After Ransom.)

**Subfamily COSMOCERCINÆ Railliet, 1916.**

**Definition.**—OXYURIDÆ: male with two equal spicules; gubernaculum present.

**KEY TO GENERA.**

1. Posterior extremity of both sexes  
blunt and rounded . . . . . *Amblyonema*, p. 210.  
Posterior extremity of both sexes  
finely pointed . . . . . 2
2. Males with plectanes . . . . . 3  
Males without plectanes . . . . . 4



3. Males with a pouch-shaped caudal alæ on each side of cloaca . . . . . *Cosmocercella*, p. 208.  
 Males without pouch-shaped caudal alæ . . . . . *Cosmocerca*, p. 206.
4. Males with very wide caudal alæ, and with only about three caudal papillæ . . . . . *Syphaciella*, p. 209.
- Males with caudal alæ very narrow or absent, and with about twelve caudal papillæ . . . . . *Aplectana*, p. 208.

Genus **COSMOCERCA** Diesing, 1861.

Syn., *Nematoxys* Schneider, 1866.

*Ananconus* Railliet and Henry, 1916.

*Definition*.—**COSMOCERCINÆ**: mouth with three small lips; cuticle of male ornamented on the ventral surface with two or

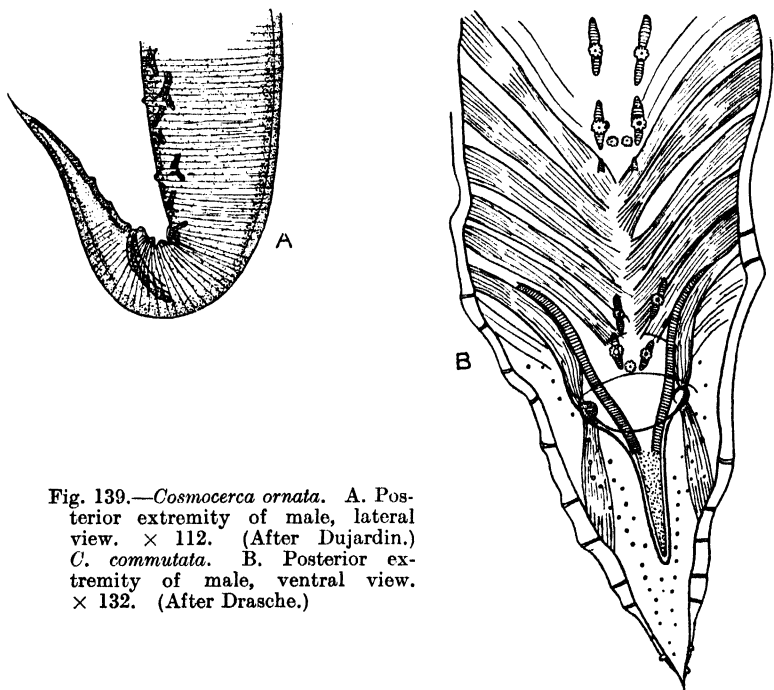


Fig. 139.—*Cosmocerca ornata*. A. Posterior extremity of male, lateral view.  $\times 112$ . (After Dujardin.) *C. commutata*. B. Posterior extremity of male, ventral view.  $\times 132$ . (After Drasche.)

four rows, each consisting of thirteen or fourteen plectanes, of which two or three are postanal; lateral flanges absent; œsophagus cylindrical followed by a bulb separated from the rest by a con-

striction. Male: posterior extremity bent ventrally and rapidly narrowing behind the anus, it may or may not end in three points; spicules equal; gubernaculum present. Female: posterior extremity terminating in a long delicate process which may or may not end in three fine points; vulva in front of the middle of the body. Viviparous. Parasites of amphibia.

Type species: \**C. trispinosa* Railliet and Henry, 1916.  
♂ 3–4 mm., ♀ 4–5 mm. In intestine and lung of *Triton alpestris*.

Syn., *Oxyuris ornata* Walter, 1856, not Duj., 1845.

*C. ornata* Dies., 1861.

Other species:

*C. ornata* (Duj., 1845). In *Rana esculenta* and *Rana temporaria*.

Syn., *Oxyuris ornata* Duj., 1845.

*C. commutata* (Dies., 1851). In *Bufo viridis*.

Syn., *Ascaris commutata* Dies., 1851.

*Nematoxys ornatus* Dujardin of Schneider, 1866.

*Ananconus commutatus* (Dies., 1851) Railliet and Henry, 1916.

Refs. 123, 128, 131, 444, 445, 480.

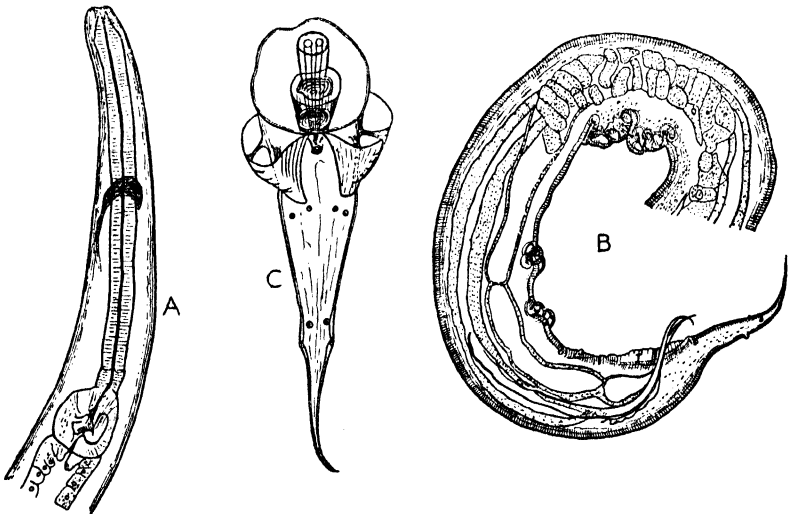


Fig. 140.—*Cosmocercella haberi*. A. Anterior extremity. B. Posterior extremity of male, lateral view. C. Posterior extremity of male, ventral view. (After Steiner.)

\* The literature dealing with this genus is very complicated, but so far as it is possible to ascertain, there appear to be three species, viz., *C. trispinosa*, having four rows of plectanes and a trifold tail, *C. ornata*, having four rows of plectanes and a simple tail, and *C. commutata*, having two rows of plectanes and a simple tail.

Genus **COSMOCERCELLA** Steiner, 1924.

*Definition.*—**COSMOCERCINÆ**: mouth with three lips, with six labial and four head papillæ; cuticle of male ornamented on the ventral surface with two rows of plectanes, and with a short pouch-shaped caudal ala on each side of the cloaca; lateral flanges present; œsophagus cylindrical and followed by a bulb containing a valvular apparatus. Male: posterior extremity bent ventrally, rapidly narrows behind the cloaca and ends in a finely-pointed tail; pre- and post-anal papillæ present; spicules long and equal; gubernaculum present. Female: posterior extremity terminating in a long conical process; vulva near the middle of the body. Viviparous. Parasites of amphibia.

Type species: *C. haberi* Steiner, 1924. ♂ 1.7 mm., ♀ 1.9 mm. In the Carolina tree frog *Hyla carolinensis*.

Ref. 588.

Genus **APLECTANA** Railliet and Henry, 1916.

Syn., *Aplecta* Railliet and Henry, 1916, preoccupied.

*Nematoxys* Schneider, 1866, in part.

*Definition.*—**COSMOCERCINÆ**: mouth with three lips; cuticle smooth without plectanes; lateral flanges present; vestibule present with three small teeth; œsophagus cylindrical and divided indistinctly into two parts, a short anterior part or pharynx and a longer posterior part followed by a bulb separated from the rest by a constriction; excretory pore in front of the bulb. Male: posterior extremity bent ventrally, rapidly narrowing behind the anus and ending in a pointed tail; very narrow caudal alæ sometimes present; on each side is a row of about twelve papillæ, of which three to five are behind the anus; spicules equal and not winged; gubernaculum present. Female: posterior extremity conical and pointed; vulva near the middle of the body. Oviparous or viviparous. Parasites of the intestine of amphibia and reptiles.

Type species: *A. acuminata* (Schränk, 1788). ? 5–7 mm. In *Rana esculenta*, etc.

Syn., *Ascaris acuminata* Schränk, 1788.

*Nematoxys commutatus* Schneider, 1866, not Diesing, 1851.

Other species:

*A. brevicaudata* (Zeder, 1800). In *Bufo* spp., *Rana* spp.

Syn., *Fusaria brevicaudata* Zeder, 1800, not *Oxysoma brevicaudatum* Schneider, 1866.

*A. contorta* (Linstow, 1906). In *Bufo vulgaris*.

*A. dogieli* (Skrjabin, 1916). In *Buфонidæ*.

? *A. fecunda* (Rud., 1819). In *Rana cornuta*, *Hyla* sp.

*A. linstowi* nom. nov. In *Bufo viridis*.

Syn., *Nematoxys unguiculatus* Linstow, 1906.

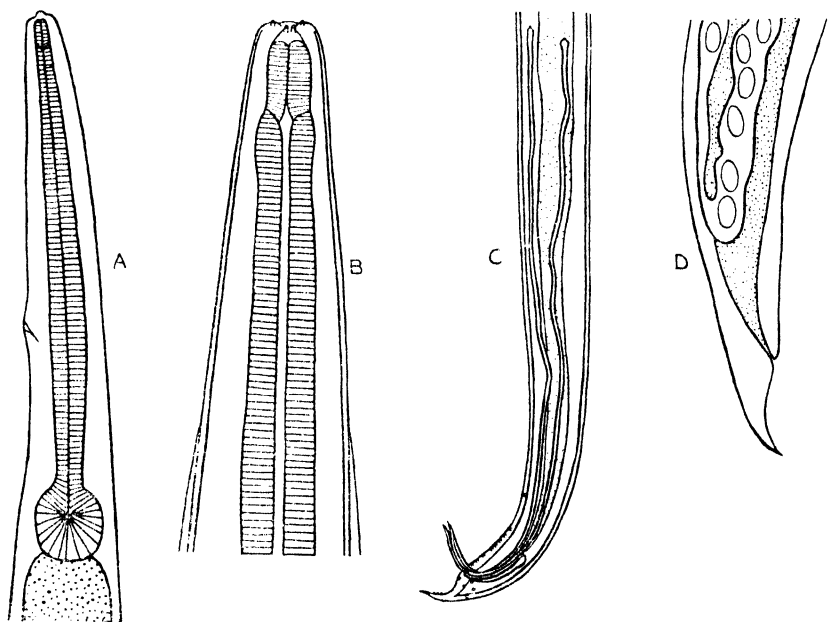


Fig. 141.—*Aplectana brevicaudata*. A. Anterior extremity, lateral view.  $\times 75$ . B. Anterior extremity, ventral view.  $\times 215$ . C. Posterior extremity of male, lateral view.  $\times 46$ . D. Posterior extremity of female.  $\times 75$ . (Orig.)

*A. membranosa* (Schneider, 1866). In *Rana* sp., *Leptodactylus ocellatus*.

*A. perezii* (Gendre, 1911). In *Chamæleon gracilis*.

*A. pusilla* Miranda, 1924. In *Amphisbæna* sp.

*A. unguiculata* (Rudolphi, 1819) Miranda, 1924. In *Amphisbæna* sp.

Refs. 166, 352, 444, 445, 480, 481, 573, 681.

#### Genus **SYPHACIELLA** Monnig, 1924.

*Definition*.—COSMOCERCINÆ: mouth with three distinct bilobed lips each bearing two projecting papillæ; vestibule present containing triangular teeth arising from the end of the œsophagus; lateral flanges present: œsophagus slightly enlarged posteriorly, and followed by a bulb containing a valvular apparatus and

separated from the rest by a constriction. Male: posterior extremity tapers rapidly behind the cloaca and is prolonged into a finely-pointed tail; broad caudal alæ not supported by pedunculated papillæ; on each side of the cloaca are three small sessile papillæ; spicules finely chitinized and difficult to see; gubernaculum distinct. Female: posterior extremity prolonged into

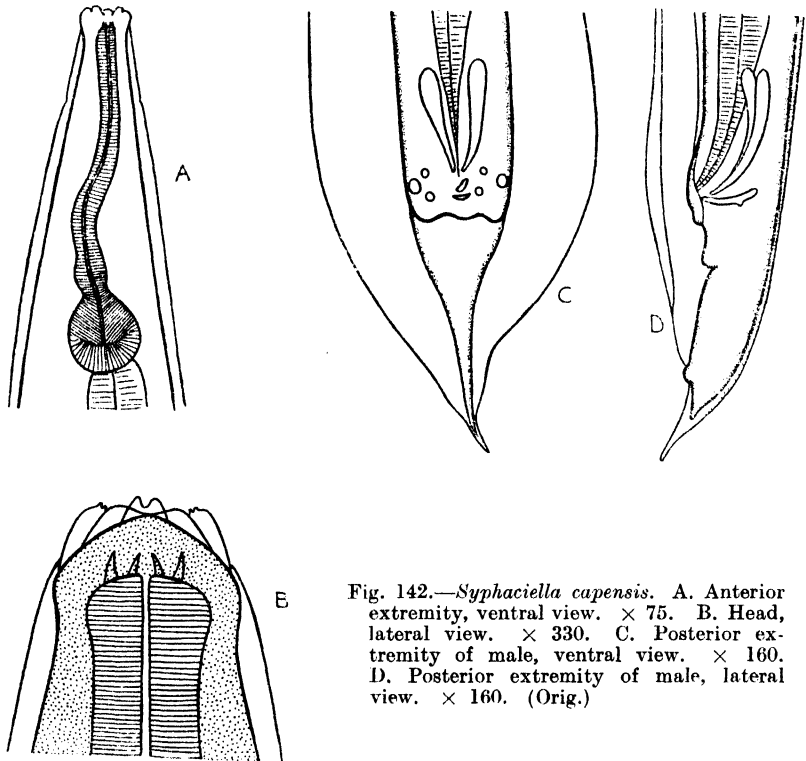


Fig. 142.—*Syphaciella capensis*. A. Anterior extremity, ventral view.  $\times 75$ . B. Head, lateral view.  $\times 330$ . C. Posterior extremity of male, ventral view.  $\times 160$ . D. Posterior extremity of male, lateral view.  $\times 160$ . (Orig.)

a delicate tail; vulva with prominent lips situated anteriorly. Oviparous, eggs oval with a plug at one pole and with a thick striated shell. Parasites of birds.

Type species: *S. capensis* Monnig, 1924. ♂ 4.5 mm., ♀ 5–6 mm. In *Pteroclorus namaqua*, *Pterocles bicinctus*.

Refs. 362, 363.

#### Genus **AMBLYNEMA** Linstow, 1898.

*Definition*.—**COSMOCERCINÆ**: mouth with three lips; cuticle with narrow lateral flanges; vestibule short with three teeth; œsophagus cylindrical with a posterior bulb, and followed by a

larger bulb separated from the rest by a constriction. Male : posterior extremity rounded ; caudal alæ absent ; three pairs of preanal and one pair of postanal papillæ ; spicules equal, relatively short, stout, and winged ; gubernaculum present. Female : tail

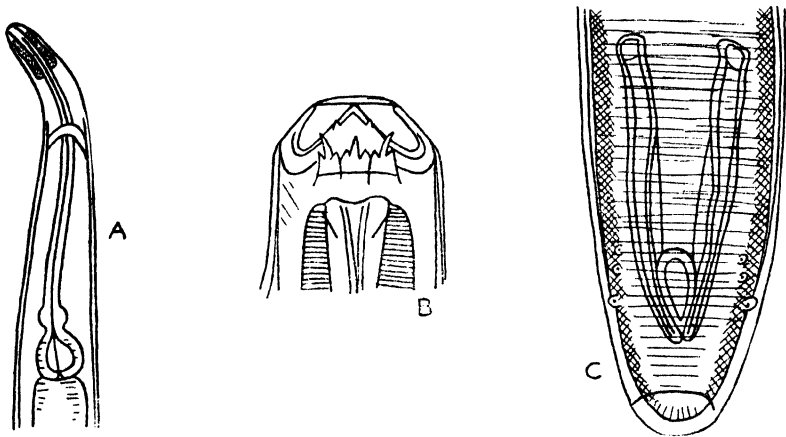


Fig. 143.—*Amblyonema terdentatum*. A. Anterior extremity. B. Head, ventral view. C. Posterior extremity of male, ventral view. (After Linstow.)

relatively short and rounded ; vulva behind the middle of the body. Oviparous. Parasites of fishes.

Type species : *A. terdentatum* Linstow, 1898. ♂ 8 mm., ♀ 10.4 mm. In *Ceratodus forsteri* (the Australian lung fish).

Refs. 316, 444, 445.

### OXYURIDÆ of uncertain position.

Genus **DERMATOPALLARYA** Skrjabin, 1924.

*Definition*.—OXYURIDÆ : mouth with three lips ; with a definite buccal cavity ; cuticle with well-developed asymmetrical cervical alæ terminating near the posterior end of the œsophagus ; œsophagus cylindrical with a posterior bulb containing a valvular apparatus. Male : tail conical with broad caudal alæ ; in front of the cloaca is an S-shaped comb-like crest consisting of separate chitinous plates, and in front of this are two median ventral combs or “mamelons” ; spicule ? ; gubernaculum ? Female : body tapers regularly behind the anus to end in a conical tail ; vulva in front of the middle of the body. Oviparous. Parasites of rodents.

Type species: *D. baylisi* Skrjabin, 1924. ♂ 5.24 mm., ♀ 11.4 mm. In *Spermophilopsis lep'odactylus*.

Skrjabin considers that this genus occupies an intermediate position between *Dermatoxys* and *Syphacia*, but as the spicules

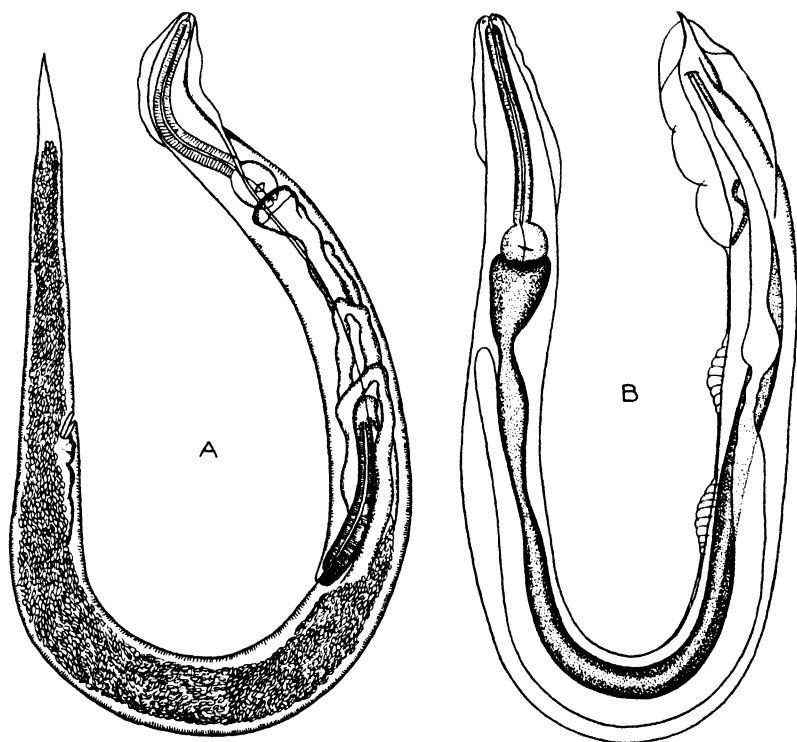


Fig. 144.—*Dermatopallarya baylisi*. A. Female. B. Male. (After Skrjabin.)

and gubernaculum could not be properly examined in the specimens available, it is impossible to place the genus in its subfamily.

Ref. 582a.

**Genus ODONTOGETON Allgén, 1921.**

*Definition.*—OXYURIDÆ: mouth situated in a shallow depression; the anterior extremity is furnished with a cuticular hood which bears internally the teeth of the buccal cavity and externally a crown of powerful posteriorly directed hooks. Œsophagus with a posterior bulb provided with a valvular apparatus; excretory pore slightly in front of the œsophageal bulb. Male: precloacal muscles well-developed; with one pair of preanal and three of postanal papillæ; spicules long, equal

and powerful ; gubernaculum ? Female : with double genitalia ; vulva a little behind middle of body. Parasites of warthogs.

Type species : *O. phacochæri* Allgén, 1921. ♂ and ♀ 4–6 mm. In *Phacochærus æthiopicus*.

Ref. 3b.

Genus **OXYASCARIS** Travassos, 1920.

*Definition.*—OXYURIDÆ : marked sexual dimorphism, females much larger than the males. Meromyarian ; mouth with three

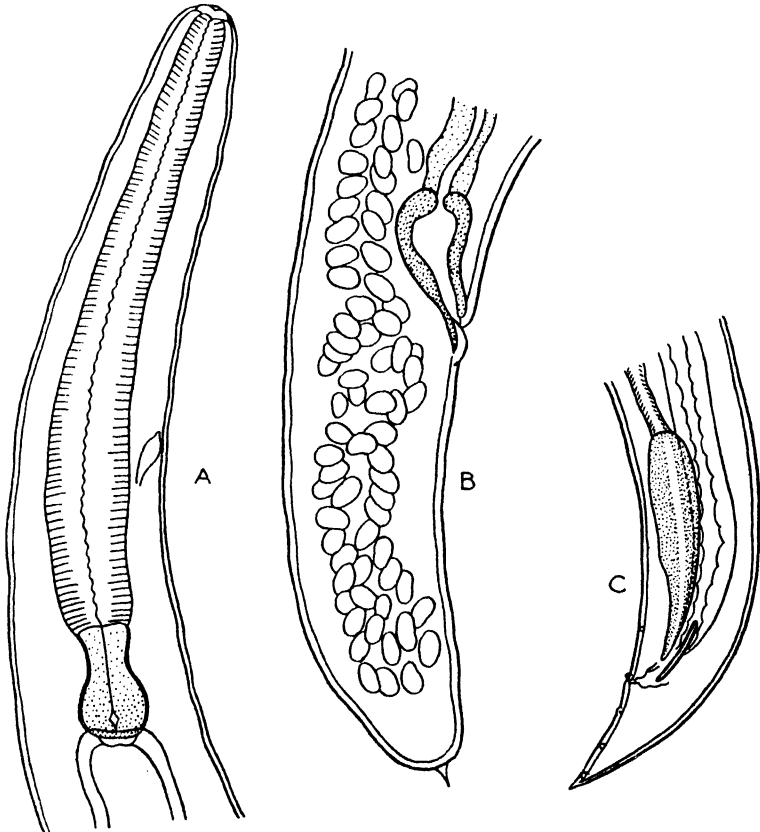


Fig. 145.—*Oxyascaris oxyascaris*. A. Anterior extremity, lateral view.  $\times 64$ . B. Tail of female, lateral view.  $\times 64$ . C. Tail of male, lateral view.  $\times 100$ . (After Travassos.)

small lips ; œsophagus without a definite bulb, but differentiated posteriorly into a ventriculus ; intestine terminates in a large strongly chitinated piriform dilatation. Male : tail conical, caudal alæ absent, with a few pairs of pre- and post-anal papillæ ; spicules subequal and lightly chitinated ; gubernaculum ? Female :



tail digitiform and ending in a short, sharply conical process ; vulva a little in front of middle of body ; anus some distance in front of the posterior extremity of the body, the uterus extending backwards beyond it. Oviparous, eggs *in utero* embryonated. Parasites of reptiles and amphibia.

Type species : *O. oxyascaris* Travassos, 1920. ♂ 5·6 mm., ♀ 14–17 mm. In *Drymobius bifossatus*.

Other species : *O. similis* Travassos, 1920. In *Leptodactylus ocellatus*, *Bufo* sp.

Travassos (1920) considers that this genus occupies a position intermediate between the *Ascaroidea* and *Oxyuroidea*, and creates for it a new family, *Oxyascaridæ* Travassos, 1920.

Refs. 639a, 647a.

#### FAMILY HETERAKIDÆ RAILLIET AND HENRY, 1914.

*Definition*.—OXYUROIDEA : medium or small worms ; mouth with three well-defined lips ; vestibule absent ; œsophagus with a short narrow anterior portion (pharynx) and a long posterior part ending in a bulb ; intestine simple without a diverticulum. Male : with a definite circular preanal sucker, with a chitinous rim ; spicules equal or unequal. Female : tail elongate ; two ovaries ; vulva usually near the middle of the body. Oviparous.

#### Subfamily HETERAKINÆ Railliet and Henry, 1912.

*Definition*.—HETERAKIDÆ : with characters of the family.

#### KEY TO GENERA.

- |  |                          |
|--|--------------------------|
| With cervical cordons . . . .  | 1                        |
| Without cervical cordons . . . .   | 2                        |
| 1. Males with caudal alæ . . . .   | Pseudaspidodera, p. 220. |
| Males without caudal alæ . . . .   | Aspidodera, p. 219.      |
| 2. Males with large caudal alæ supported by pedunculated papillæ . . . .                                   | 3                        |
| Males with caudal alæ absent or narrow, and not supported by pedunculated papillæ . . . .                  | 6                        |
| 3. Caudal alæ short and broad, posterior extremity of male truncate, sucker close to cloaca . . . .        | Strongyluris p. 221.     |
| Caudal alæ longer and narrower, posterior extremity of male conical, sucker not so close to cloaca . . . . | 4                        |

- |  |                         |
|--|-------------------------|
| 4. Spicules unequal . . . . .                  | Heterakis, p. 215.      |
| Spicules equal . . . . .                       | 5                       |
| 5. Preanal sucker pedunculated . . . . .       | Ganguleterakis, p. 218. |
| Preanal sucker sessile . . . . .               | Gireterakis, p. 219.    |
| 6. Gubernaculum absent . . . . .               | Africana, p. 225.       |
| Gubernaculum present . . . . .                 | 7                       |
| 7. Parasites of warm-blooded animals . . . . . | Paraspidodera, p. 221.  |
| Parasites of cold-blooded animals . . . . .    | Spinicauda, p. 223.     |

Genus **HETERAKIS** Duj., 1845.

*Definition.*—**HETERAKINÆ**: cuticle usually with lateral flanges; œsophagus with a short narrow anterior portion (pharynx) and with

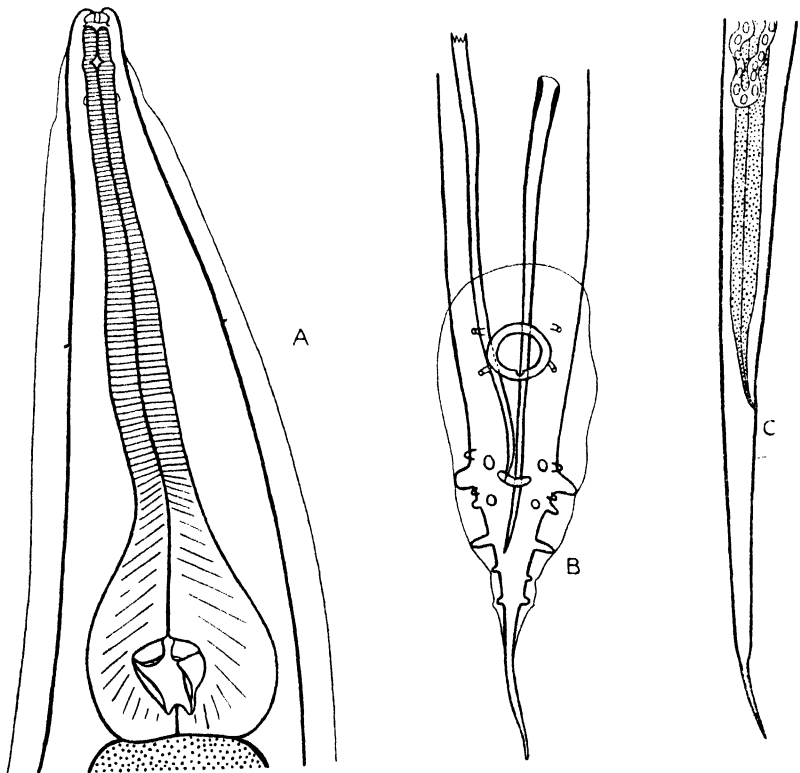


Fig. 146.—*Heterakis vesicularis*. A. Anterior extremity, dorsal view.  $\times 90$ . B. Posterior extremity of male, ventral view.  $\times 90$ . C. Posterior extremity of female, lateral view.  $\times 46$ . (Orig.)

a long broader posterior portion ending in a well-developed bulb containing a valvular apparatus. Male: caudal alæ well-developed supported by about ten to fifteen pairs of costiform papillæ;

spicules equal or unequal; gubernaculum absent. Female: vulva near the middle of the body, or in front of it; uteri opposed. Oviparous, eggs with a thick shell and with a clear granulation at one pole. Parasites of birds and mammals.

Type species: *H. vesicularis* (Frölich, 1791) Duj., 1845.  
♂ 8–10 mm., ♀ 11–13 mm. In fowls and ducks.

Syn., *Ascaris papillosa* Bloch, 1782, in part.

*Ascaris vesicularis* Frölich, 1791.

Other species:

*H. alata* Schneider, 1866. In *Tinamus* sp.

*H. arquata* Schneider, 1866. In *Cypturus* sp., *Tinamus* sp.

*H. bancrofti* Johnston, 1912. In *Cathetus lathamii*.

*H. beramporia* Lane, 1914. In domesticated fowls.

*H. bosia* Lane, 1914. In *Cerionis satyra*.

*H. brevispiculum* Gendré, 1911. In *Numida meleagris*,  
*Gallus* sp.

*H. caudata* Linstow, 1906. In *Lampronessa sponsa*.

*H. chenonettæ* Johnston, 1912. In *Chenonetta jubata*.

*H. circumvallata* Linst., 1906. In *Cygnus atratus*.

*H. dahomensis* Gendré, 1911. In *Cricetomys gambianus*.

*H. dispar* (Schränk, 1790). In geese.

*H. fariai* Travassos, 1913. In *Odontophorus capueira*.

*H. girardi* (Lane, 1917). In birds and the Bengal porcupine.

Syn., *Gireterakis girardi* Lane, 1917.

*H. hamulus* Linst., 1906. In *Pavo spicifer*.

*H. interlabiata* Ortlepp, 1923. In *Rhizothera longirostris*.

*H. isolonche* Linstow, 1906. In *Thaumalea* sp., *Lophophorus*  
sp., *Tragopan* sp.

*H. longicaudata* Linstow, 1879. In *Megacephalon* sp., etc.

*H. macroura* Linst., 1883. In *Megaloperdix nigeli*.

*H. monticelliana* Stossich, 1892. In *Otis tarda*.

Syn., *H. stylosa* Linstow, 1907.

*H. nattereri* Travassos, 1923. In *Crax blumenbachii*.

*H. paradoxa* Linst., 1906. In *Didelphys dorsigera*.

*H. psophiæ* Travassos, 1913. In *Psophia viridis*.

*H. putaustralis* Lane, 1914. In domesticated fowl.

*H. spumosa* Schneider, 1866. In *Mus decumanus*.

Syn., *Ganguleterakis gangula* Lane, 1914.

*H. tenuicauda* Linstow, 1883. In *Ammoperdix griseogularis*.

Syn., *H. numidæ* Leiper, 1908.

*H. valvata* Schneider, 1866. In *Crypturus cupreus*.

Refs. 72, 131, 205, 256, 260, 262, 275, 379, 436, 441, 546, 601,  
620, 647.

Lane (1914, and 1917) divided the genus *Heterakis* into the following three genera.

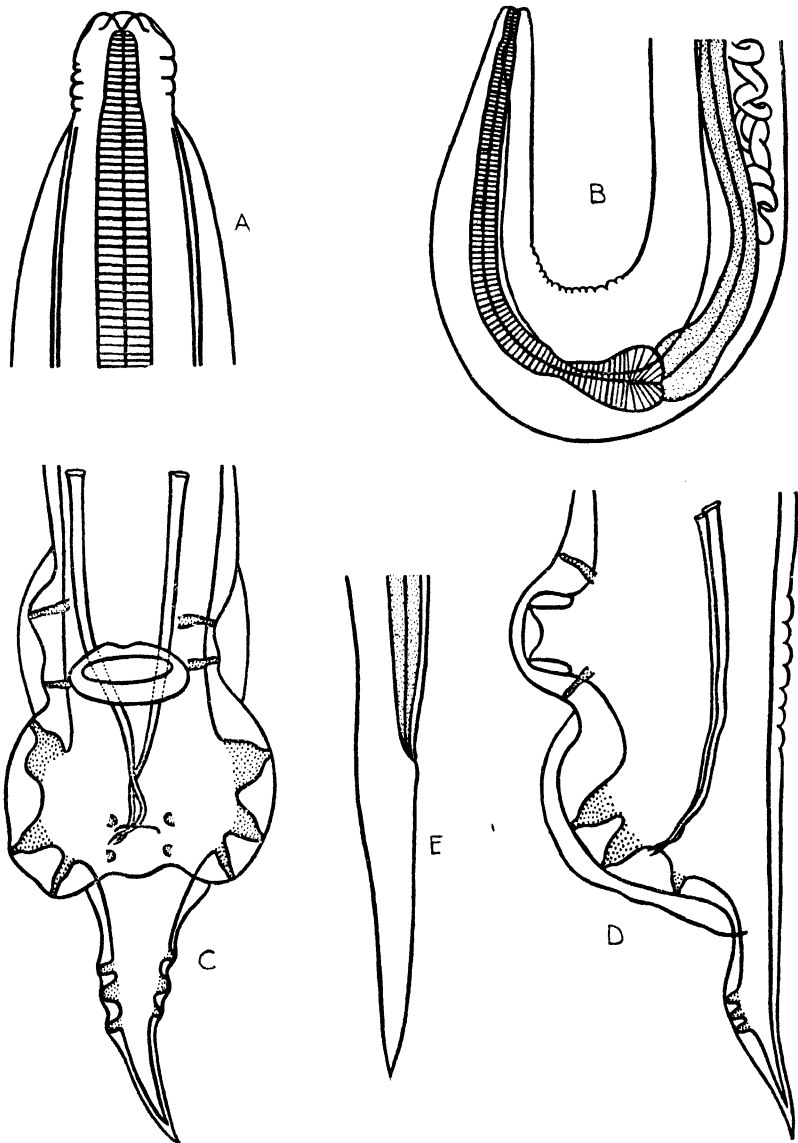


Fig. 147.—*Ganguleterakis spumosa*. A. Anterior extremity, dorsal view.  $\times 180$ . B. Anterior extremity, lateral view.  $\times 76$ . C. Posterior extremity of male, ventral view.  $\times 180$ . D. Posterior extremity of male, lateral view.  $\times 180$ . E. Posterior extremity of female, lateral view.  $\times 76$ . (Orig.)

Genus **HETERAKIS** Duj., 1845, restr. Lane, 1914.

*Definition*.—**HETERAKIS** s. l. with twelve pairs of caudal papillæ in the male; spicules unequal and dissimilar; vulva near the middle of the body.

Type species: *H. vesicularis* (Frölich, 1791). In fowls and ducks.

Genus **GANGULETERAKIS** Lane, 1914.

*Definition*.—**HETERAKIS** s. l. with only ten pairs of caudal papillæ in the male; spicules equal and similar; sucker pedunculated, and the tail of the male with a great ventral cuticular thickening.

Type species: *G. spumosa* (Schneider, 1866). In *Mus decumanus*.

Syn., *Heterakis spumosa* Schneider, 1866.

*Ganguleterakis gangula* Lane, 1914.

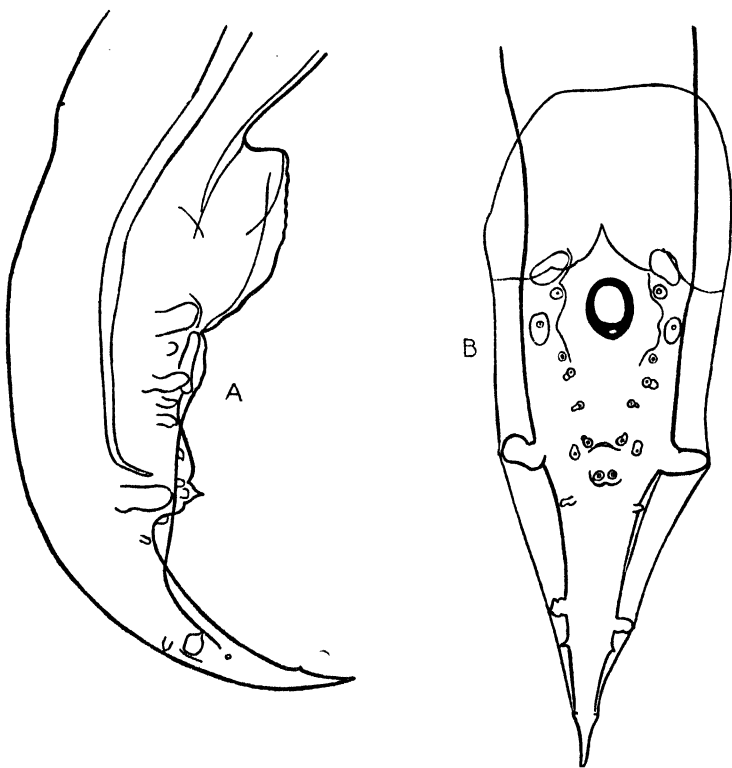


Fig. 148.—*Gireterakis girardi*. A. Posterior extremity of male, lateral view.  $\times 65$ . B. Posterior extremity of male, ventral view,  $\times 65$ . (After Lane.)

Genus **GIRETERAKIS** Lane, 1917.

*Definition*.—**HETERAKIS** s. l. with fifteen pairs of caudal papillæ in the male ; spicules equal and similar ; vulva at the junction of the middle and anterior thirds of the body.

Type species : *G. girardi* Lane, 1917. In *Hystrix bengalensis*.

If it is found desirable to subdivide the genus on the question of equality and inequality of the length of the spicules, then many of the species commonly placed in *Heterakis* must be transferred to one or other of Lane's genera, e.g., *dahomensis*, *brevispiculum*, *psophiæ*, *interlabiata*, *tenuicauda*, *arquata*, etc.

Genus **ASPIDODERA** Railliet and Henry, 1912.

Syn., *Aspidocephalus* Diesing, 1851, preoccupied.

*Definition*.—**HETERAKINÆ** : cuticle with cervical cordons describing six longitudinal loops, three of the anterior limbs being

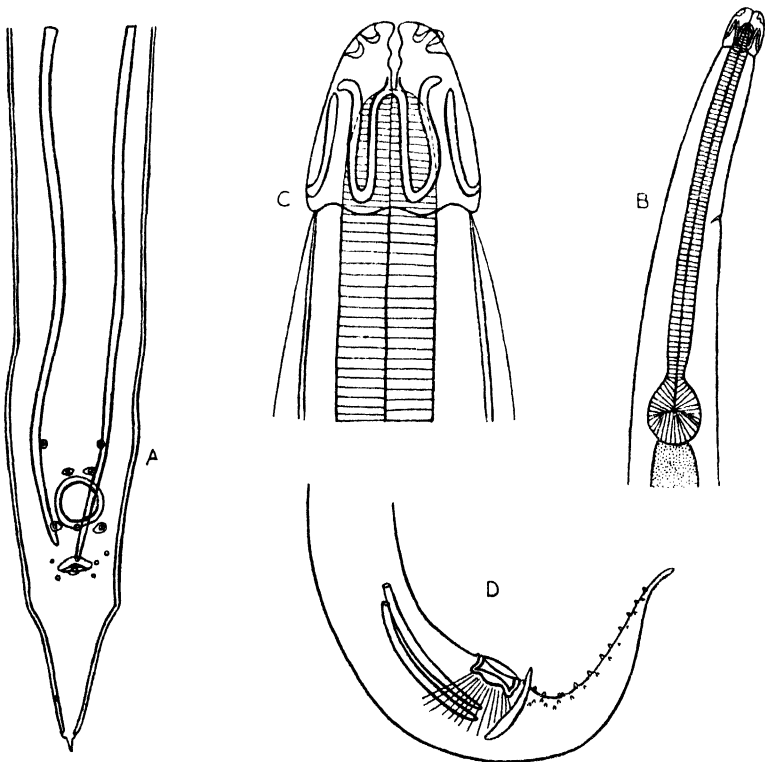


Fig. 149.—*Aspidodera scoleciformis*. A. Posterior extremity of male, ventral view. (After Travassos.)

*A. fasciata*. B. Anterior extremity, lateral view.  $\times 46$ . C. Head, ventral view.  $\times 215$ . D. Posterior extremity of male, lateral view,  $\times 75$ . (Orig.)

prolonged as a canal to open into each interlabial space; lateral flanges small. Male: caudal alæ absent; spicules equal; gubernaculum present. Female: vulva near the middle of the body; uteri opposed. Oviparous, eggs with a thin shell, containing an unsegmented ovum. Parasites of S. American marsupials and edentata.

Type species: *A. scoleciformis* (Diesing, 1851). ♂ 10 mm., ♀ 12 mm. In *Cabassus* spp., *Dasypus* spp., *Didelphys* spp., etc.

Syn., *Aspidocephalus scoleciformis* Dies., 1851.

Other species:

*A. binansata* Railliet and Henry, 1913. In *Dasypus villosus*.

*A. fasciata* (Schneider, 1866). In *Tatus* sp. and *Tolypeutes* sp.

*A. raillieti* Travassos, 1913. In *Didelphys aurita*.

*A. subulata* (Molin, 1860). In *Didelphys nudicaudata*.

Refs. 123, 260, 436, 480, 620, 621.

Genus **PSEUDASPIDODERA** Baylis and Daubney, 1922.

*Definition*.—**HETERAKINÆ**: occupies an intermediate position between the genera *Heterakis* and *Aspidodera*. It has cervical cordons similar to, but rather less highly-developed than those of,

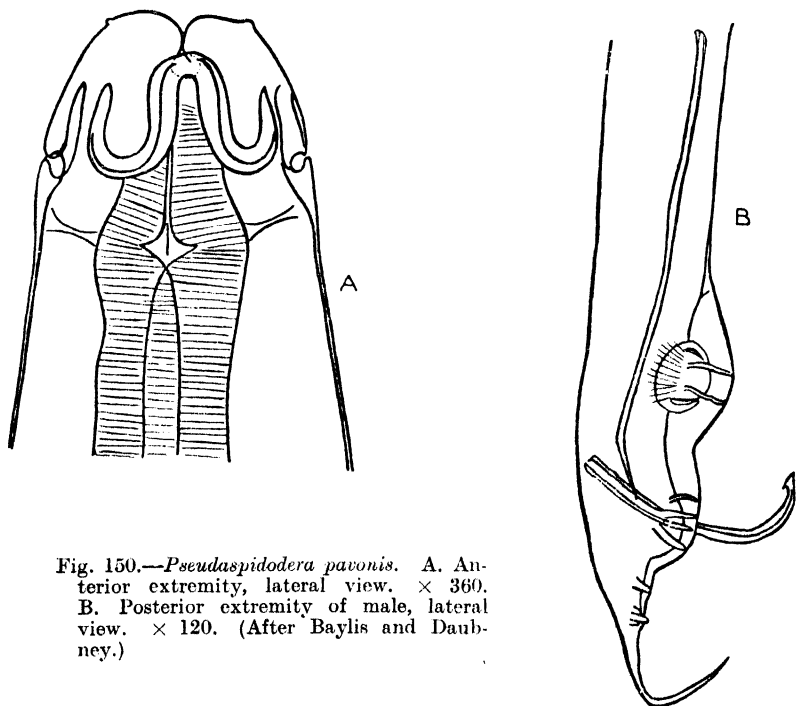


Fig. 150.—*Pseudaspidodera pavonis*. A. Anterior extremity, lateral view.  $\times 360$ . B. Posterior extremity of male, lateral view.  $\times 120$ . (After Baylis and Daubney.)

*Aspidodera*, while in the male, caudal alæ are present, with long costiform papillæ like those of *Heterakis* in shape and development ; spicules very unequal ; gubernaculum absent.

Type species : *P. pavonis* Baylis and Daubney, 1922. ♂ 6 mm., ♀ 7 mm. In the pea fowl.

Ref. 42.

Genus **PARASPIDODERA** Travassos, 1914.

*Definition.*—**HETERAKINÆ**: closely resembles *Aspidodera*, except that the cervical cordons are absent. Male : caudal alæ absent ;

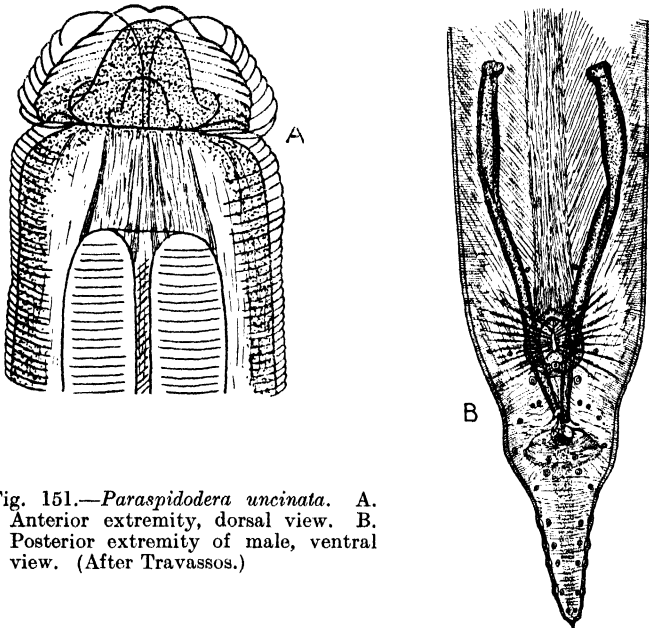


Fig. 151.—*Paraspidodera uncinata*. A. Anterior extremity, dorsal view. B. Posterior extremity of male, ventral view. (After Travassos.)

spicules almost equal ; gubernaculum present. Female : vulva in front of the middle of the body. Parasites of rodents.

Type species : *P. uncinata* (Rud., 1819) of Travassos, 1914. ♂ 11 mm., ♀ 16 mm. In *Agouti paca*, *Cavia* spp.

Syn., *Ascaris uncinata* Rud., 1819, of Travassos, 1914.

Refs. 477, 621.

Genus **STRONGYLURIS** Müller, 1894.

*Definition.*—**HETERAKINÆ**: cuticle generally furnished with small papillæ, especially in the anterior part ; œsophagus divided into a narrow anterior portion (pharynx) and a wider posterior portion ending in a bulb. Male : posterior extremity truncated ;



sucker relatively near the anus; caudal alæ short and broad, supported by very thick pedunculated papillæ; spicules equal, long, and thin; gubernaculum absent. Female: vulva behind the middle of the body; uteri opposed. Oviparous, eggs ellipsoidal

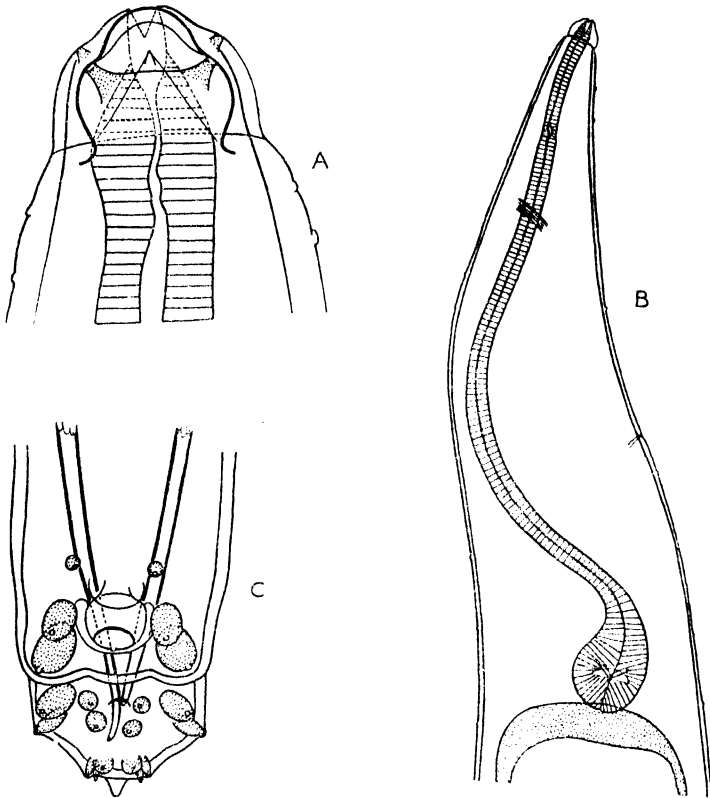


Fig. 152.—*Strongyluris brevicaudata*. A. Head, dorsal view.  $\times 330$ . B. Anterior extremity, lateral view.  $\times 46$ . C. Posterior extremity of male, ventral view.  $\times 90$ . (Orig.)

with a thick shell, containing an embryo at deposition. Parasites of reptiles.

Type species: *S. brevicaudata* Müller, 1894. ♂ 6–9 mm. ♀ 7–12 mm. In *Agama colonorum*.

Other species:

\* *S. calotis* Baylis and Daubney, 1923. In *Calotes nigrilabris*.

\* *S. chamæleonis* Baylis and Daubney, 1922. In *Chamæleon vulgaris*.

\* According to Taylor (1924), these worms are probably identical with *S. brevicaudata*.

- \* *S. elegans* (Gendre, 1909). In *Chamæleon gracilis*.
  - S. gigas* Spaul, 1923. In *Agama distantii*.
  - \* *S. ornata* (Linstow, 1897). In *Stellio vulgaris*.
  - S. oscari* Travassos, 1923. In *Tropidurus* sp.
  - S. paronai* (Stossich, 1902). In *Amphibolurus muricatus*.
  - \* *S. streptosophaeus* Connal, 1912. In *Agama colonorum*.
- Refs. 164, 260, 364, 573, 587, 610, 620, 621, 637.

Genus **SPINICAUDA** † Travassos, 1920.

Syn., *Sonsinia* Baylis and Daubney, 1922.

*Definition.*—**HETERAKINÆ**: closely resembles *Strongyluris*, except that the tail of both sexes is long and subulate, and in the

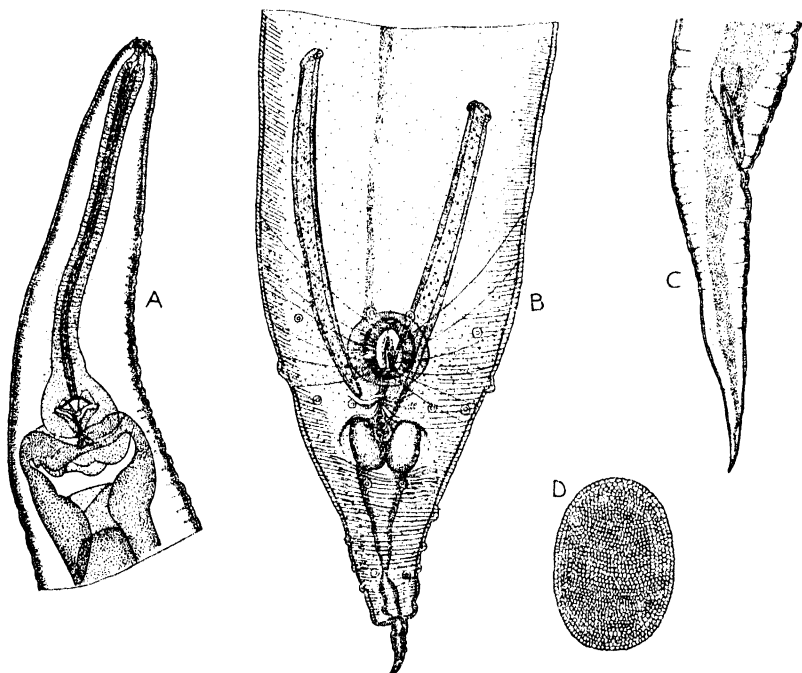


Fig. 153.—*Spinicauda spinicauda*. A. Anterior extremity. B. Posterior extremity of male, ventral view. C. Posterior extremity of female, lateral view. D. Egg. (After Travassos.)

\* According to Taylor (1924), these worms are probably identical with *S. brevicaudata*.

† Travassos (1919) suggested a subfamily *Spinicaudinae* to include the genera *Spinicauda*, *Strongyluris*, and *Africana*. So far as we can ascertain the only justification for this is the fact that these are all parasites of cold-blooded animals. There do not appear to be any morphological characters whereby one can distinguish the *Spinicaudinae* from the *Heterakinæ*, and in point of fact the genus *Spinicauda* seems to be indistinguishable from *Paraspidodera*.

male the caudal alæ are absent or rudimentary; the papillæ are sessile; the spicules are short and subequal; a gubernaculum is present: in the female the vulva is near the middle of the body. Oviparous, eggs with a thick, often rugose, shell. Parasites of reptiles.

Type species: *S. spinicauda* (Olfers, 1819). ♂ 5–7 mm., ♀ 5–7 mm. In *Lacerta teguixin*, *Ctenodon* sp., etc.

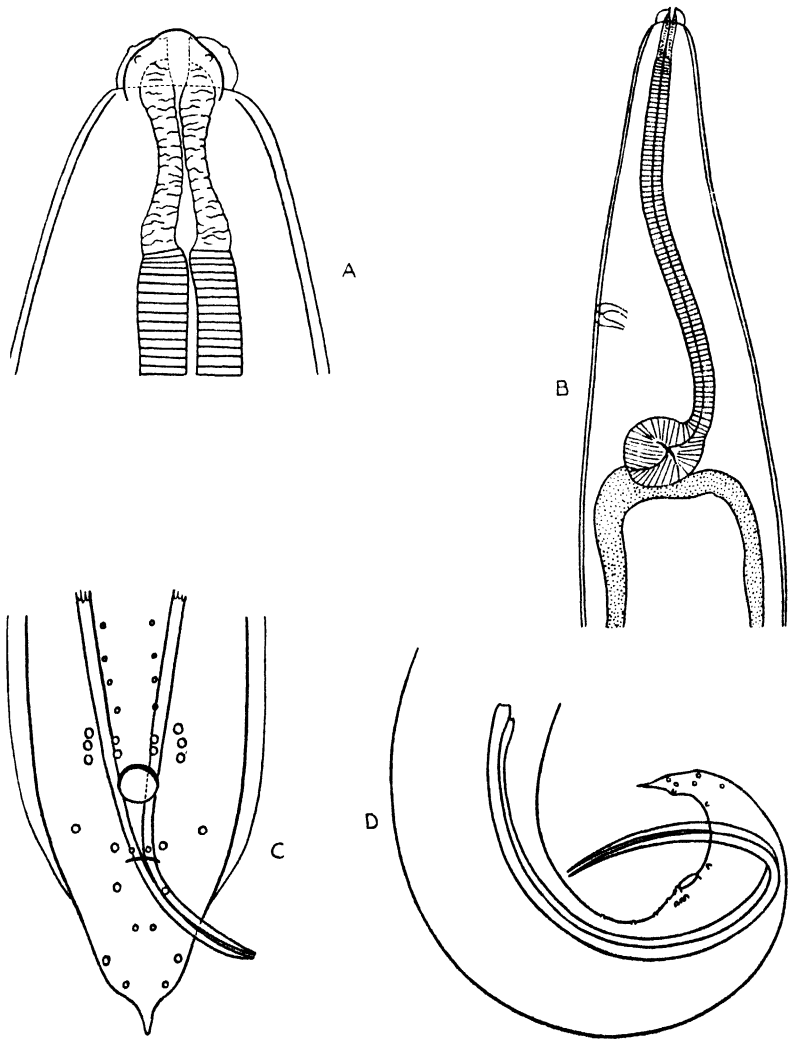


Fig. 154.—*Africana africana*. A. Anterior extremity, dorsal view.  $\times 330$ . B. Anterior extremity, lateral view.  $\times 75$ . C. Posterior extremity of male, ventral view.  $\times 75$ . D. Posterior extremity of male, lateral view.  $\times 75$ . (Orig.)

Other species :

*S. campanula* (Linstow, 1899). In *Agama* sp.

*S. wosiensis* (Seurat, 1917). In *Gingylus ocellatus*.

*S. sonsinoi* (Linstow, 1894). In *Gingylus* sp., *Lacerta* sp. and *Chamæleon* sp.

Syn., *Sonsinia sonsinoi* (Linstow, 1904) Baylis and Daubney, 1922.

Refs. 42, 636, 637.

#### Genus AFRICANA Travassos, 1920.

*Definition.*—HETERAKINÆ: resembles *Strongyluris*, except that the caudal alæ are narrow and the papillæ are sessile; the spicules are long and thin, equal or unequal; gubernaculum absent. Female: vulva in front of the middle of the body. Parasites of reptiles.

Type species: *A. africana* (Gendre, 1909). ♂ 4.5–5 mm., ♀ 3.1–5.77 mm. In *Cinixys belliana*.

Syn., *Heterakis africana* Gendre, 1909.

Other species :

*A. acuticeps* (Gedoelst, 1916). In *Chamæleon* spp.

*A. brodeni* (Gedoelst, 1916). In *Chamæleon* sp.

Refs. 151, 163, 610, 637.

#### FAMILY SUBULURIDÆ n. f.

*Definition.*—OXYUROIDEA: medium or small worms; mouth with lips inconspicuous or absent; vestibule present, usually with teeth in its depth; œsophagus with a posterior bulb; intestine simple. Male: precloacal muscles well-developed and usually forming an elongate sucker, or pseudosucker, without a chitinous rim; spicules usually two, equal or unequal, rarely one or even none; gubernaculum usually present. Female: with the posterior extremity pointed; vulva variable in position. Parasites of warm-blooded animals.

#### KEY TO SUBFAMILIES.

Œsophagus very short and thick, the anterior portion being only about the same length as the posterior bulb . . . . . Hoplodontophorinæ, p. 233.

Œsophagus much longer, the anterior portion being many times the length of the posterior bulb . Subulurinae, p. 226.

**Subfamily SUBULURINÆ Travassos, 1914.**

*Definition.*—SUBULURIDÆ: vestibule usually cylindrical with three triangular teeth in its depth; œsophagus relatively long, with a posterior bulb. Male: with precloacal muscles usually forming an elongate sucker or pseudosucker. Parasites of birds and mammals.

**KEY TO GENERA.**

1. Males without spicules or gubernaculum . . . . . Heteroxynema, p. 231.  
     Males with one spicule and a gubernaculum . . . . . Oxyntema, p. 230.  
     Males with two spicules and a gubernaculum . . . . . 2
2. Males with preanal sucker represented by a cuticular prominence, and with large caudal alæ: vulva near anus. Maupasina, p. 232.  
     Males with preanal sucker of usual type, and with rudimentary caudal alæ: vulva near middle of body . . . . . 3
3. Preanal sucker oval, surrounded by a rim of cuticular trabeculæ . . . . . Numidica, p. 229.  
     Preanal sucker fusiform without cuticular trabeculæ . . . . . 4
4. Vestibule clearly divided into two parts and strongly chitinated . . . . . Allodapa, p. 228.  
     Vestibule not so clearly divided into two parts and lightly chitinated . . . . . Subulura, p. 226.

**Genus SUBULURA Molin, 1860.**

*Definition.*—SUBULURINÆ: mouth elongate dorso-ventrally; lateral flanges usually present; vestibule with a very thin chitinous lining and not clearly divided into two parts, at the base are three large strongly chitinated teeth with sharp points; œsophagus dilated posteriorly and followed by a bulb. Male: preanal sucker fusiform, and some distance in front of the cloaca; caudal alæ slightly-developed or absent; a longitudinal row of papillæ, up to eleven in number, on each side; spicules equal or unequal; gubernaculum present. Female: vulva near the middle of the body;

uteri divergent. Oviparous, eggs subglobular, with a thin shell, and frequently embryonated at time of deposition. Parasites of birds, and mammals, *e.g.*, primates, lemurs, carnivora, and rodents.

Type species: *S. acutissima* Molin, 1860. ♂ 7 mm., ♀ 12 mm. In *Strix* and *Cuculus* sp.

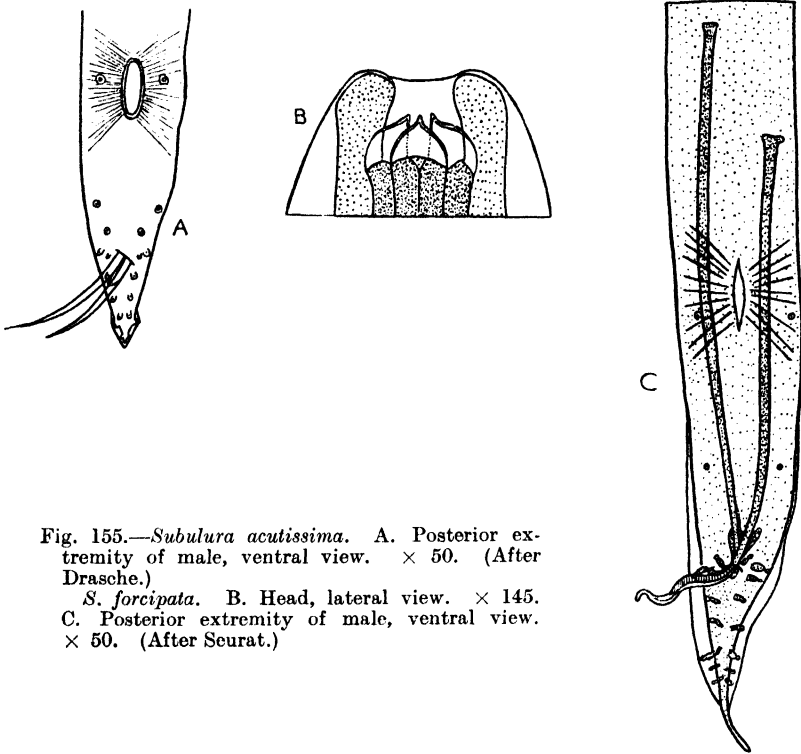


Fig. 155.—*Subulura acutissima*. A. Posterior extremity of male, ventral view.  $\times 50$ . (After Drasche.)  
*S. forcipata*. B. Head, lateral view.  $\times 145$ .  
 C. Posterior extremity of male, ventral view.  $\times 50$ . (After Seurat.)

Other species :

? *S. acuticauda* (Linstow, 1901) Railliet and Henry, 1913. In *Numida* sp.

*S. andersoni* (Cobbold, 1876). In *Sciurus* sp.

? *S. anulata* (Molin, 1860) Travassos, 1913. In *Ophis saurocephalus*.

*S. bentocruzi* Barreto, 1919. In *Trogon* sp.

*S. carlosi* Barreto, 1919. In *Piaya cayanna*.

*S. curvata* (Linstow, 1883). In *Perdix græca*, *Caccabis* sp.

*S. differens* (Sonsino, 1890). In *Gallus* sp., etc.

*S. distans* (Rud., 1809). In *Cercopithecus* spp.

- S. forcipata* (Rud., 1819). In *Coccyzus* spp., *Cuculus* sp., *Diplopterus* sp., etc.
- S. galloperdicis* Baylis and Daubney, 1922. In *Galloperdix spadicea*.
- ? *S. gracilis* (Linst., 1899) Railliet and Henry, 1913. In *Francolinus* sp.
- S. halli* Barreto, 1917. In *Tetrax* sp.
- S. jacchi* (Marcel, 1857). In *Callithrix* spp.
- S. lutzi* Barreto, 1918. In *Strix* sp.
- ? *S. macronis* (Stewart, 1914) Barreto, 1917. In *Macrones aor*.
- S. olympioi* Barreto, 1918. In *Crypturus* sp., etc.
- S. otolicni* (van Beneden, 1890). In *Galago* sp.
- Syn., *S. loveridgei* Baylis, 1920. In *Mungos fasciatus*.
- S. papillosa* (Molin, 1860). In *Cervus cajanus*, *Cyanocorax* sp.
- ? *S. perarmata* (Ratzel, 1868) Railliet and Henry, 1913. In *Tarsius* sp.
- S. pigmentata* Gedoelst, 1917. In *Sciurus* sp.
- S. plotina* Baylis, 1919. In *Plotus rufus*.
- S. poculum* (Linstow, 1909). In *Francolinus* sp.
- S. reclinata* (Rud., 1819). In *Crotophaga* spp.
- S. recurvata* (Linstow, 1901). In *Eurystomus* sp.
- S. rima* (Linstow, 1906). In *Otis haubara*, etc.
- S. rimula* (Linstow, 1903). In *Centropus sinensis*.
- S. sarasinorum* (Meyer 1896). In *Loris gracilis*.
- S. schebeni* (Linstow, 1909). In *Cynictis* sp.
- S. seurati* Barreto, 1917. In *Caccabis* spp.
- S. similis* (Gendre, 1909). In *Centropus* sp., *Coracias* sp., etc.
- S. strongylina* (Rud., 1819). In *Crypturus* spp., *Bucco* spp.
- Tinamus* sp., etc.
- S. subulata* (Rud., 1819). In *Caprimulgus* spp.
- S. travassosi* Barreto, 1919. In *Bucco* spp., etc.
- S. trogoni* Barreto, 1919. In *Trogon viridis*.
- S. uncinata* (Rud. 1819) of Hall, 1916. In *Cavia apera*, *Cavia paca*.

Refs. 15, 26, 42, 72, 205, 256, 359, 500, 620.

**Genus ALLODAPA Diesing, 1861.**

*Definition*.—**SUBULURINÆ**: closely resembling *Subulura*, and, according to Seurat, differing only in that its vestibule is heavily chitinized and clearly divided into two parts. Barreto (1917 and 1919), however, holds that this difference is merely specific, and that *Allodapa* is synonymous with *Subulura*.

Type species : *Allodapa allodapa* (Creplin, 1853). ♂ 4–10 mm., ♀ 12–14 mm. In *Dicholophus cristatus*, *Cariama cristata*.

Syn., *Oxyuris allodapa* Creplin, 1853.

*Allodapa typica* Dies., 1861.

*Heterakis sutoria* Molin, 1860, in part.

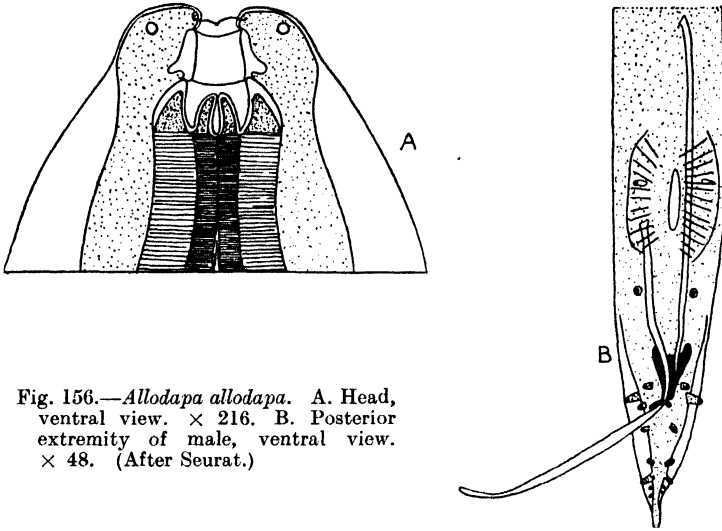


Fig. 156.—*Allodapa allodapa*. A. Head, ventral view.  $\times 216$ . B. Posterior extremity of male, ventral view.  $\times 48$ . (After Seurat.)

Other species :

*A. elongata* Seurat, 1914. In *Dipodilla campestris*.

*A. leprincei* (Gendre, 1909). In *Caprimulgus* sp.

*A. noctuæ* Seurat, 1914. In little owls.

*A. sutoria* (Molin, 1860, in part, Drasche, 1883). In fowls, etc.

Refs. 12, 205, 500, 501, 510.

Genus NUMIDICA Barreto, 1917.

*Definition*.—SUBULURINÆ: mouth bounded laterally by two indistinct lips each bearing three papillæ; lateral cephalic alæ absent; vestibule with thick chitinous walls clearly divided into two parts, the posterior of which contains three teeth at the entrance to the œsophagus; œsophagus with a slight club-shaped swelling posteriorly, and followed by a bulb separated from the rest by a constriction. Male: preanal sucker modified, being represented by an elliptical area surrounded by a margin of cuticular trabeculæ; caudal alæ very small; ten pairs of genital papillæ; spicules unequal, the right strongly chitinized and the left so lightly chitinized as to be scarcely visible; gubernaculum



narrow and strongly chitinized. Female: vulva about the junction of the anterior and middle thirds of the body; uteri divergent. Oviparous. Parasites of carnivora.

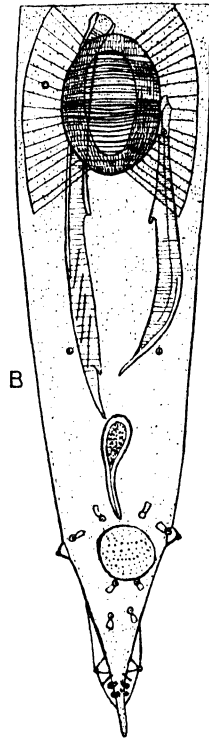
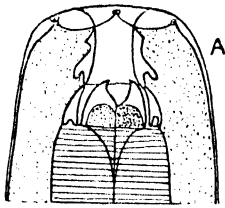


Fig. 157. — *Numidica numidica*.  
A. Head. B. Posterior extremity of male, ventral view.  
(After Seurat.)

Type species: *N. numidica* (Seurat, 1915). ♂ 13.5–18 mm., ♀ 25 mm. In Algerian fox.

Syn., *Allodapa numidica* Seurat, 1915.

Refs. 15, 519.

**Genus OXYNEMA Linstow, 1899.**

*Definition.*—SUBULURINÆ: mouth with rudimentary lips and six cephalic papillae; vestibule large, cylindrical, with three teeth in its lower part; oesophagus followed by a bulb. Male: caudal alae very narrow; ten or eleven pairs of caudal papillae; spicule single; gubernaculum present. Female: vulva near the middle of the body. Oviparous. Parasites of carnivora and rodents.

Type species: *O. crassispiculum* (Sonsino, 1889). ♂ 12 mm., ♀ 18 mm. In *Vulpes* spp.

Syn., *Heterakis crassispiculum* Sonsino, 1889.

*Oxyinema rectum* Linstow, 1899.

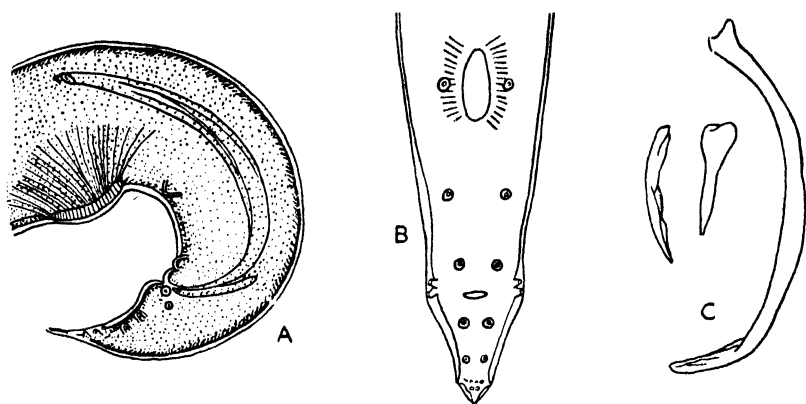


Fig. 158.—*Oxyinema crassispiculum*. A. Posterior extremity of male, lateral view. (After Linstow.)  
*O. boueti*. B. Posterior extremity of male, ventral view. C. Spicule and gubernaculum. (After Gendre.)

Other species :

*O. boueti* (Gendre, 1911). In *Xerus erythropus*.

Syn., *Heterakis boueti* Gendre, 1911.

? *Ascaris uncinata* Rud., 1819.

Refs. 13, 15, 165, 205, 318, 585.

Genus **HETEROXYNEMA** Hall, 1916.

*Definition*.—SUBULURINÆ: mouth with three lips; well-developed cervical alæ present; vestibule shallow; teeth, if present, feebly-developed; œsophagus with a posterior bulb. Male: tail straight and conical; preanal sucker fusiform with

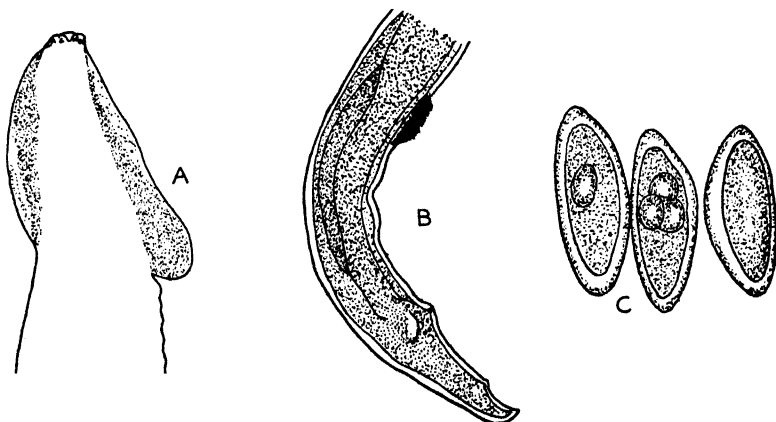


Fig. 159.—*Heteroxyinema cucullatum*. A. Anterior extremity, ventral view.  $\times 48$ . B. Posterior extremity of male, lateral view.  $\times 72$ . C. Eggs.  $\times 260$ . (After Hall.)

lateral cuticular membranes ; caudal alæ very narrow ; spicules absent ; gubernaculum absent. Female : vulva at the junction of the anterior and middle thirds of the body. Oviparous.

Type species : *H. cucullatum* Hall, 1916. ♂ 2.8 mm., ♀ 4–8 mm. In *Eutamias amoenus operarius*.

Refs. 15, 205.

Genus **MAUPASINA** Seurat, 1913.

Syn., *Maupasiella* Seurat, 1913, preoccupied.

*Definition*.—SUBULURINÆ : mouth with two lateral indistinct lips ; cervical alæ absent ; vestibule clearly divided into two

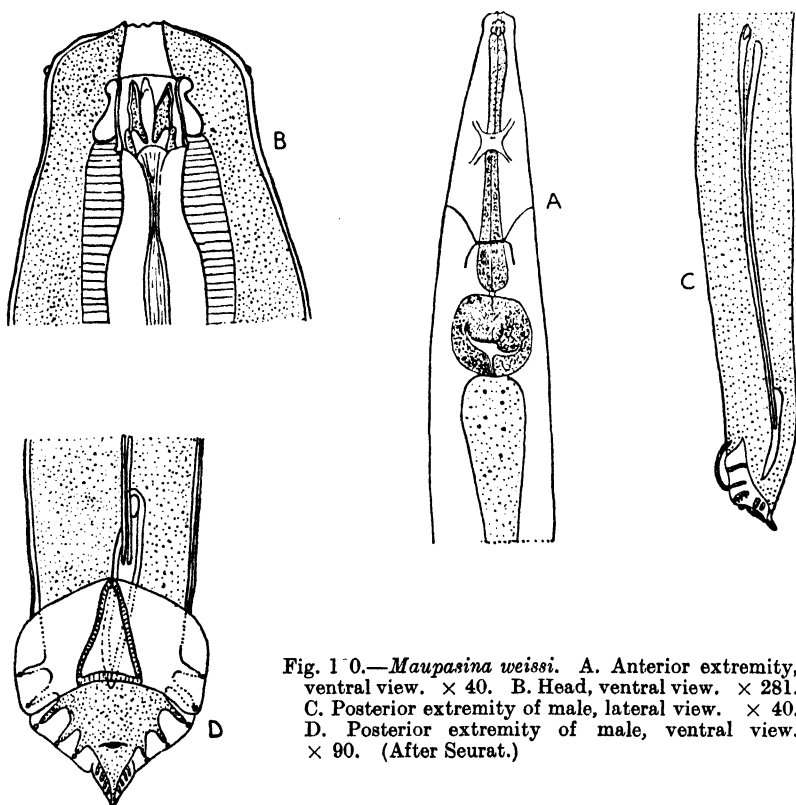


Fig. 10.—*Maupasina weissi*. A. Anterior extremity, ventral view.  $\times 40$ . B. Head, ventral view.  $\times 281$ . C. Posterior extremity of male, lateral view.  $\times 40$ . D. Posterior extremity of male, ventral view.  $\times 90$ . (After Seurat.)

portions, of which the posterior is occupied by three tricuspid teeth ; cesophagus dilated posteriorly and followed by a bulb. Male : preanal sucker replaced by a vesicular prominence ; large caudal alæ supported by ten pairs of pedunculated papillæ ; spicules equal and very long ; gubernaculum long. Female : vulva near anus. Parasites of shrews.

Type species : *M. weissii* Seurat, 1913. ♂ 12.7 mm., ♀ 16-17 mm.  
In *Elephantulus deserti*.

Syn., *Maupasiella weissii* Seurat, 1913.

Refs. 205, 491, 494, 539.

Subfamily HOPLDONTOPHORINÆ n. sf.

*Definition*.—SUBULURIDÆ: vestibule shallow and armed with pointed teeth; œsophagus very short and stout with a large posterior bulb. Male: preanal sucker prominent, horseshoe-shaped with teeth in the gap between the limbs; spicule single. Parasites of mammals.

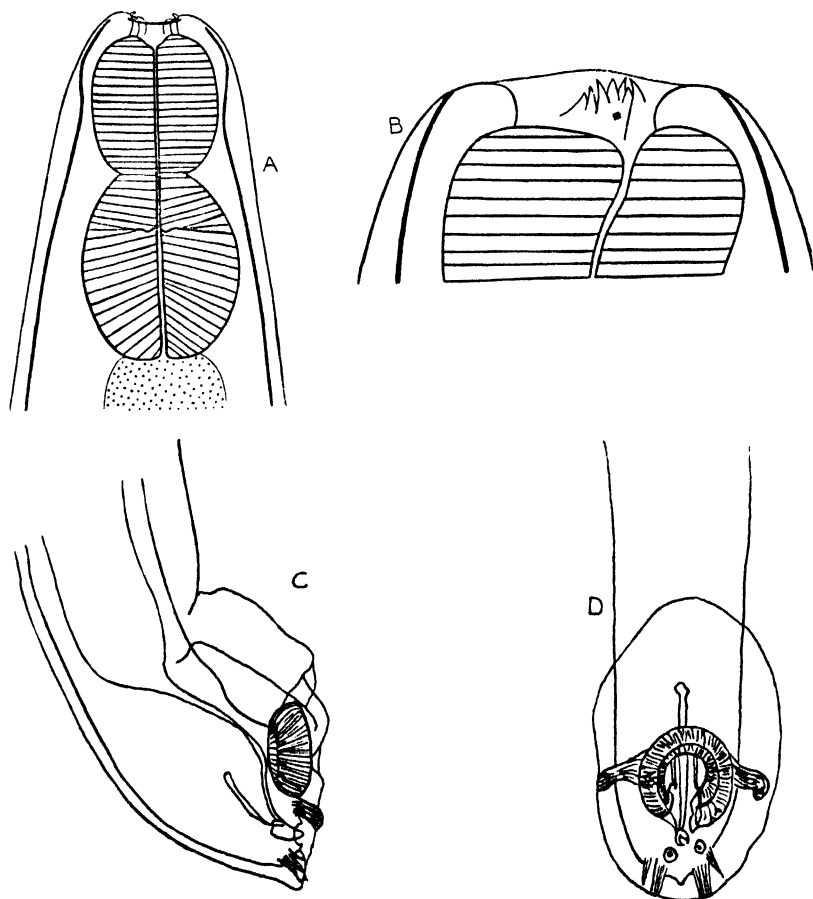


Fig. 161.—*Hoplodontophorus flagellum*. A. Anterior extremity, ventral view.  $\times 56$ . B. Anterior extremity, lateral view.  $\times 160$ . (Orig.) C. Posterior extremity of male, lateral view. D. Posterior extremity of male, ventral view. (After Turner.)

Genus **HOPLODONTOPHORUS** Turner, 1921.

*Definition.*—**HOPLODONTOPHORINÆ**: mouth elongate dorso-ventrally and surrounded by two larger lateral, and smaller dorsal, and ventral lips; vestibule present and armed with about twelve teeth; œsophagus very short and stout with a large posterior bulb containing a valvular apparatus. Male: preanal sucker horse-shoe-shaped, walls striated with the opening posteriorly, and containing two teeth with their points directed posteriorly; posterior extremity surrounded by large alæ continuous anteriorly in front of the sucker and posteriorly behind the tip of the tail; three pairs of pedunculated papillæ—one pair large and preanal, and the other two postanal and near the tip of the tail, and in addition, one pair of ventral sessile papillæ near the cloaca; the tail ends in a short blunt point; spicule single, fairly long, with the proximal end knob-like; gubernaculum present. Female: tail long and pointed; vulva in the anterior third of the body. Oviparous, eggs flattened on one side. Parasites of Hyracoidea.

Type species: *H. flagellum* (Hemprich and Ehrenberg, 1828). ♂ 7·7–8·4 mm., ♀ 17–32 mm. In *Hyrax* sp.

Syn., *Oxyuris flagellum* Hemprich and Ehrenberg, 1828.  
Refs. 213, 362, 652.

**FAMILY KATHLANIIDÆ** (TRAVASSOS, 1918).

Syn., *Kathlanidæ* Travassos, 1918.

*Definition.*—**OXYUROIDEA**: mouth with three well-developed lips sometimes armed with teeth, vestibule without teeth in its depth; œsophagus with a posterior bulb usually preceded by a definite swelling; intestine simple. Male: with precloacal muscles well-developed and usually forming an elongate sucker without a chitinous rim. Female: with posterior extremity pointed; vulva posterior to the middle of the body. Parasites of cold-blooded animals.

**KEY TO SUBFAMILIES.**

- Lips armed with powerful teeth and  
lamellæ . . . . . *Cissophyllinæ*, p. 241.  
Lips not armed with powerful teeth and  
lamellæ . . . . . *Kathlaniinæ*, p. 235.

## Subfamily KATHLANIINÆ Lane, 1914.

*Definition.*—KATHLANIIDÆ: mouth with three distinct lips; vestibule present; cesophagus frequently with a short anterior portion (pharynx) and a larger posterior portion ending in a swelling, and followed by a bulb containing a valvular apparatus. Male: with strong oblique ventral muscles, usually forming a sucker or pseudosucker without a chitinous rim; spicules equal or unequal; gubernaculum present. Female: vulva in the posterior half of the body. Parasites of cold-blooded animals.

## KEY TO GENERA.

- With many subsidiary or intermediate  
lips . . . . . 1  
Without subsidiary or intermediate  
lips . . . . . 2
1. Spicules extremely long, almost as long  
as the worm . . . . . Tonaudia, p. 236.  
Spicules not extremely long . . . . . Kathlania, p. 235.
2. Lips united to one another by a horse-  
shoe-shaped cuticular band, vesti-  
bule large and wide, pharynx absent . . . . . Zanclophorus, p. 240.  
Lips not united by a horseshoe-shaped  
cuticular band, vestibule small,  
pharynx present . . . . . Spironoura, p. 237.

## Genus KATHLANIA Lane, 1914.

Syn., *Pseudoheterakis* Travassos, 1917.

*Oxysoma* Schneider, 1866, in part.

*Definition.*—KATHLANIINÆ: mouth with three main lips wider near their free ends; between the dorsal and each subventral lip are four subsidiary lips, and between the subventral lips five subsidiary lips; cuticle transversely striated with lateral flanges; at the bottom of the buccal cavity are three tooth-like structures; vestibule long and funnel-shaped; cesophagus consists of a long cylindrical portion terminating in a swelling and followed by a bulb separated by a constriction. Male: tail long and pointed; preanal sucker without a chitinous rim; caudal alæ present; three pairs of, and one single, preanal papillæ, and eight pairs of post- or ad-anal papillæ; spicules equal, relatively short and stout; gubernaculum present. Female: tail long and pointed;

vulva posterior to the middle of the body. Oviparous. Parasites of turtles.

Type species: *K. leptura* (Rud. 1819). ♂ 13 mm., ♀ 15 mm.  
In *Chelone midas*, *Thalassochelys* sp.

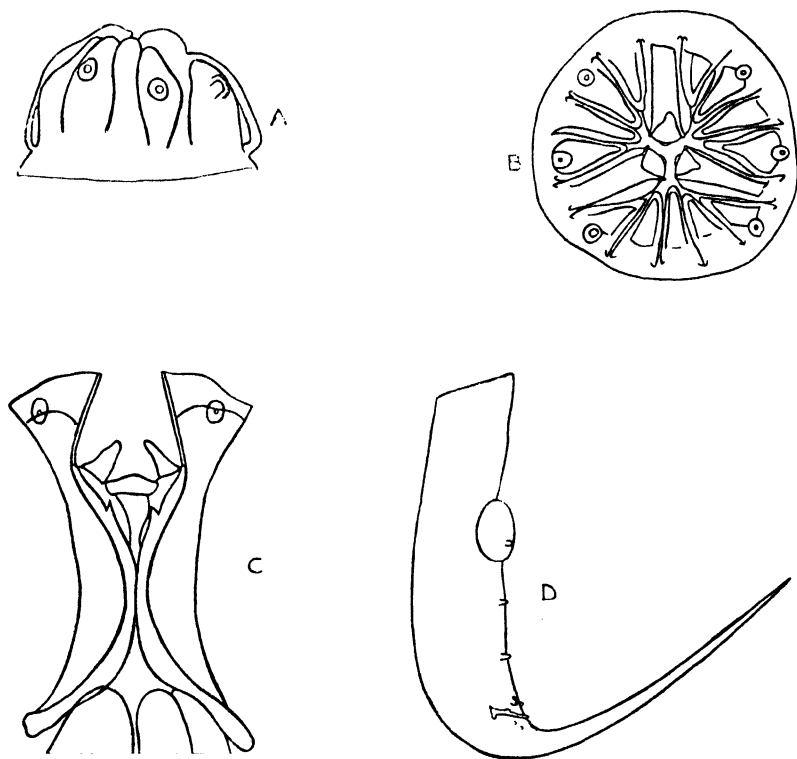


Fig. 162.—*Kathlania leptura*. A. Head, lateral view.  $\times 190$ . B. Head, end-on view.  $\times 190$ . C. Oral cavity and vestibule, dorsal view.  $\times 190$ . D. Posterior extremity of male, lateral view.  $\times 24$ . (After Clayton Lane.)

Syn., *Ascaris leptura* Rud., 1819.

*Oxysoma lepturum* (Rud., 1819) Schneider, 1866.

*K. kathlena* Lane, 1914.

*Pseudoheterakis leptura* (Rud., 1819) Travassos, 1917.

Refs. 256, 260, 477, 480, 631, 632.

**Genus TONAUDIA Travassos, 1919.**

**Definition.**—**KATHLANIINÆ**: closely resembling *Kathlania*, but distinguished from it by the extraordinary length of the spicules,

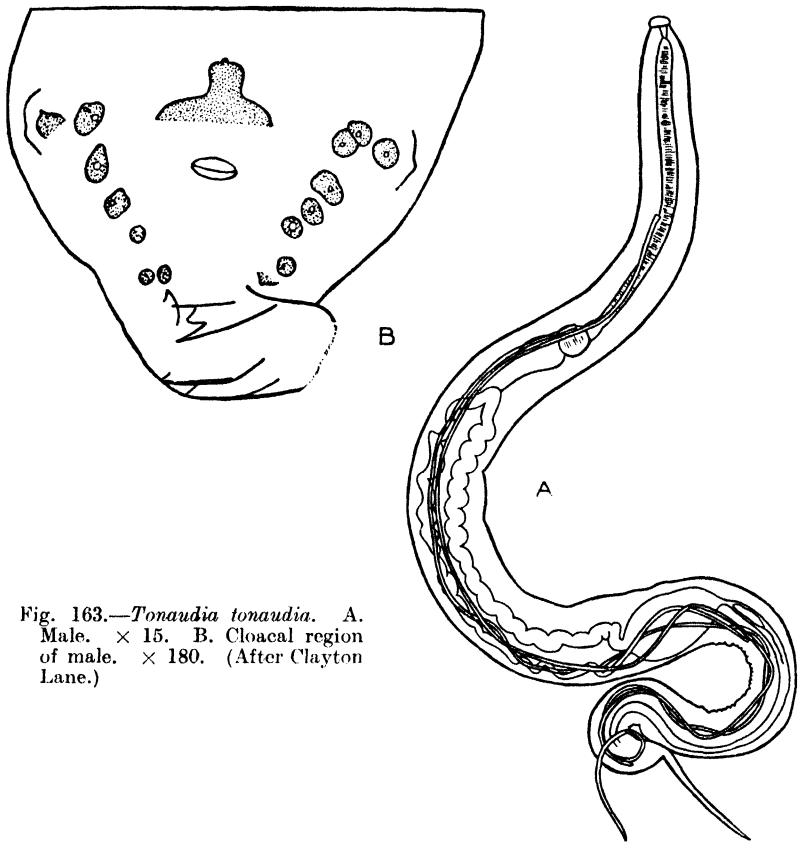


Fig. 163.—*Tonaudia tonaudia*. A. Male.  $\times 15$ . B. Cloacal region of male.  $\times 180$ . (After Clayton Lane.)

which are very slender and reach from the mid-oesophageal region to the cloaca.

Type species : *T. tonaudia* (Lane, 1914). ♂ 11.5 mm., ♀ 15 mm. In *Chelone midas*.

Syn., *Kathlania tonaudia* Lane, 1914.

Refs. 256, 636.

Genus **SPIRONOURA** Leidy, 1856.

Syn., *Spirura* Diesing, 1861, not Blanchard, 1849.

*Falcaustra* Lane, 1915.

*Florencioia* Travassos, 1919.

*Spectatus* Travassos, 1923.

**Definition.**—**KATHLANIINÆ**: mouth with three lips, each bearing two outer and two inner papillæ; cuticle smooth; lateral flanges absent; vestibule present and surrounded anteriorly by a ring of thickened cuticle; œsophagus with a short anterior portion (pharynx) and a long posterior portion ending in an hour-



glass-shaped posterior bulb separated from the rest by a constriction. Posterior extremity of both sexes tapering and pointed. Male: preanal muscles well-developed, so as frequently to form a sucker-like organ; caudal alæ absent; three pairs of preanal, and seven or nine pairs of postanal papillæ, and an unpaired

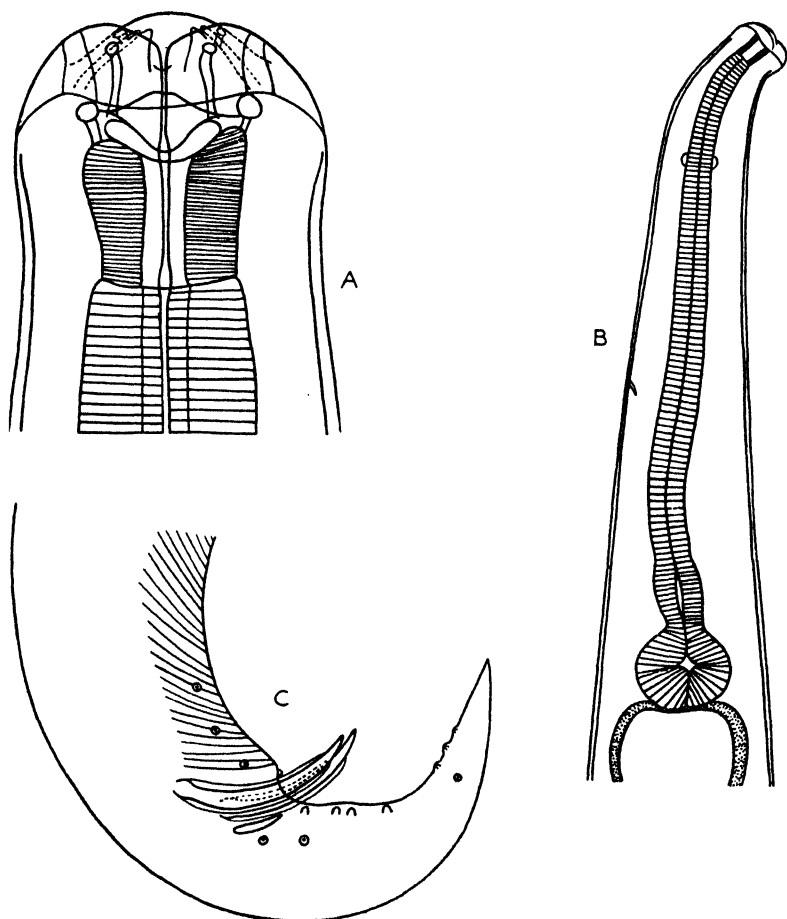


Fig. 164.—*Spironoura congolense*. A. Head, ventral view.  $\times 215$ . B. Anterior extremity, lateral view.  $\times 38$ . C. Posterior extremity of male, lateral view.  $\times 46$ . (Orig.)

median precloacal papilla; spicules equal and compressed laterally; gubernaculum usually present, sometimes imperfectly chitinized or even absent. Female: vulva towards the posterior third of the body; uteri opposed. Oviparous. Parasites of tortoises, snakes, and fishes.

Type species : *S. gracile* Leidy, 1856. ♂ 8 mm., ♀ 16 mm.  
In *Emys serrata*.

Other species :

*S. affine* Leidy, 1856. In *Cistudo carolina*.

Syn., *Falcaustra chapini* Boulenger, 1923.

*S. araxiana* (Massino, 1924). In *Emys orbicularis*.

*S. armenica* (Massino, 1924). In *Emys orbicularis*.

*S. barbi* (Baylis and Daubney, 1922). In *Barbus tor*.

*S. congolense* Taylor, 1925. In fresh-water fish.

*S. falcatum* (Linstow, 1906). In *Nicoria trijuga*.

Syn., *Falcaustra falcata* (Linstow, 1906) Lane, 1915.

*Oxysoma falcata* Linstow, 1906.

*S. kachugæ* (Stewart, 1914). In *Kachuga lineata*.

Syn., *Oxysoma kachugæ* Stewart, 1914.

*S. lambdiense* (Seurat, 1918). In *Clemmys leprosa*.

*S. leptcephalum* (Baylis and Daubney, 1922). In *Barbus tor*.

*S. masculum* (Rud., 1819). In *Drymobius bifossalus* and  
*Coluber* sp.

Syn., *Ascaris mascula* Rud., 1819.

*Florencioia mascula* (Rud., 1819) Travassos, 1919.

*S. nitidum* (Travassos, 1919). In *Cobra* sp.

Syn., *Florencioia nitida* Travassos, 1919.

*S. siamense* (Baylis, 1920). In *Hieremys annandalei*.

*S. spectatum* (Travassos, 1923). In *Piaractus brachypomus*.

Syn., *Spectatus spectatus* Travassos, 1923.

*S. stewarti* (Baylis and Daubney, 1922). In *Kachuga* sp. and  
*Hardella* sp.

*S. testudinis* (Baylis and Daubney, 1922). In *Testudo elongata*.

Travassos has added the following two genera to his family  
*Kathlaniidæ* :—

#### Genus FLORENCIOIA \* Travassos, 1919.

*Definition*.—KATHLANIINÆ : mouth with three lips ; preanal sucker slightly-developed or rudimentary—sometimes four in number ; spicules short and curved ; gubernaculum slightly-developed. Containing the species : *mascula*, *nitida* and *siamensis*.

#### Genus SPECTATUS † Travassos, 1923.

*Definition*.—KATHLANIINÆ : mouth with six lips, each with a median papilla ; œsophagus without a clearly-defined second bulb ; preanal

\* Travassos (1923) spells this genus *Florencoia*.

† In the same paper this genus is spelt *Spectalus*, *Spectatus*, and *Espectatus* : as all the figures are labelled *S. spectatus* we presume that the correct name of the genus is *Spectatus*.

sucker ellipsoidal; spicules short and curved; gubernaculum V-shaped; tail conical in both sexes; vulva median, ovejector long. Containing the species *spectatus*.

Refs. 27, 42, 93, 258, 271, 272, 328, 347a, 444, 545, 640, 645.

We do not consider it possible to break up the genus *Spironoura*, syn., *Falcaustra*, in this manner and prefer to regard these genera as synonymous with *Spironoura*. The degree of development of the preanal sucker varies very considerably in the different members of this genus, as also does the second bulb on the œsophagus; the six lips, each bearing a single papilla, of *Spectatus* can hardly be distinguished from the three bilobed lips, each bearing two papillæ, seen in such species as *Spironoura siamense*.

**Genus ZANCLOPHORUS** Baylis and Daubney, 1922.

*Definition*.—**KATHLANIINÆ**: mouth with three large lips, bordered internally by cuticular fringes and each carrying a pair

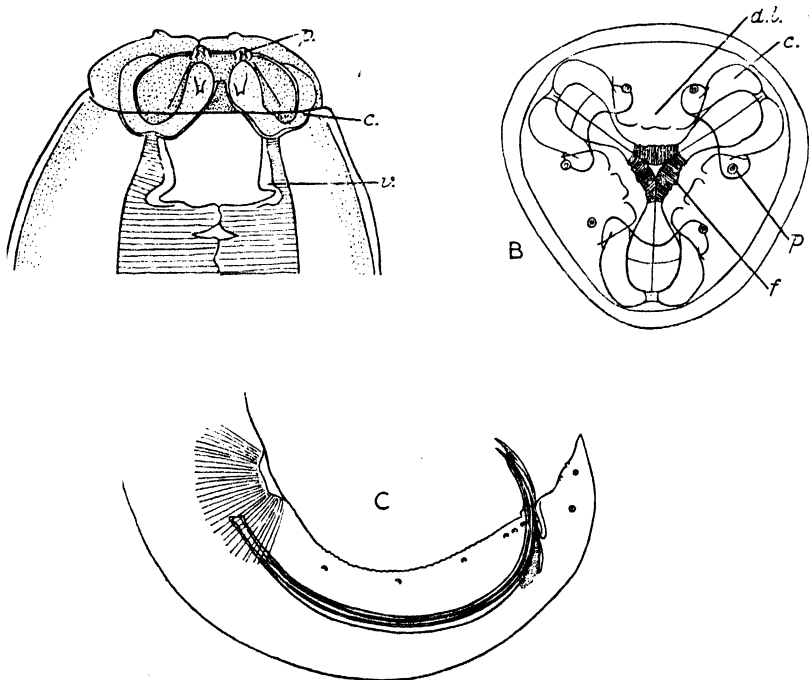


Fig. 165.—*Zanclophorus annandalei*. A. Head, dorsal view. *p*, papilla; *c*, cuticular support; *v*, vestibule.  $\times 85$ . B. Head, end-on view. *d.l.*, dorsal lip; *c*, cuticular support; *p*, papilla; *f*, fringe of lip.  $\times 190$ . C. Posterior extremity of male.  $\times 26$ . (Baylis and Daubney.)

of prominent papillæ; there are three horseshoe-shaped cuticular supports uniting the adjacent portions of the lips; vestibule well-developed; œsophagus cylindrical ending in an hourglass-shaped

bulb separated from the rest by a constriction. Male: tail conical; preanal sucker present; caudal alæ absent; about ten pairs of caudal papillæ, of which four are postanal, and one unpaired papilla immediately in front of the cloaca; spicules moderately long and equal; gubernaculum large but incompletely chitinized. Female: tail conical; vulva towards the posterior third of the body; uteri opposed. Viviparous. Parasites of stomach and intestine of *Chelonia*.

Type species: *Z. annandalei* Baylis and Daubney, 1922. ♂ 15.5–16 mm., ♀ 15–17.5 mm. In *Testudo travancorica*.

Other species:

*Z. ararath* Massino, 1924. In *Emys orbicularis*.

*Z. kempfi* Baylis and Daubney, 1922. In *Testudo elongata*.

Refs. 42, 347a.

#### Subfamily CISSOPHYLLINÆ n. sf.

*Definition*.—KATHLANIIDÆ: mouth with three lips armed with powerful teeth and lamellæ. Male: preanal sucker without a chitinous rim. Parasites of reptiles.

Genus *CISSOPHYLLUS* Railliet and Henry, 1912.

*Definition*.—CISSOPHYLLINÆ: mouth elongate dorso-ventrally with three strongly-chitinized lips, the dorsal lip armed with a

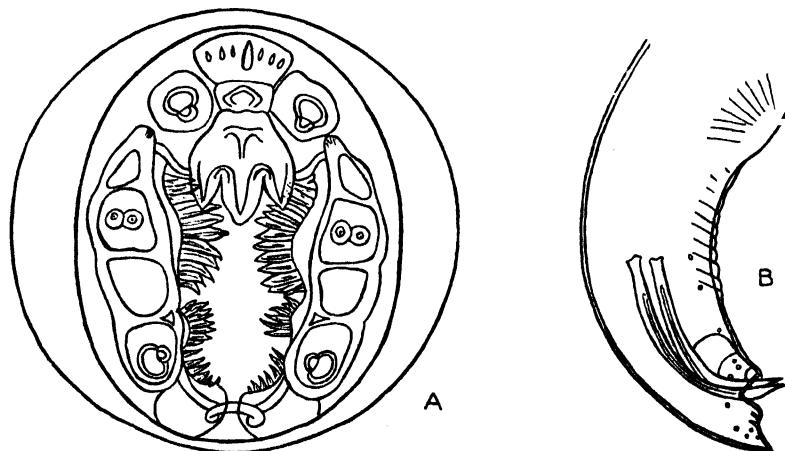


Fig. 166.—*Cissophyllus laverani*. A. Head, anterior view.  $\times 120$ . B. Posterior extremity of male, lateral view.  $\times 14$ . (After Railliet and Henry.)

powerful trilobed tooth, and the sub-ventral lips with numerous lamellæ directed towards the centre of the mouth; œsophagus

long, consisting of three parts, the first two distinguishable only by their degree of chitination, whilst the third part is of a slightly greater diameter and terminates in a globular bulb containing a valvular apparatus. Male: tail short and conical; preanal sucker oval without a chitinous rim; caudal alæ absent; six pairs of preanal and five pairs of postanal papillæ; spicules long, stout, and equal; gubernaculum present. Female: body attenuated suddenly behind the anus; tail conical; vulva in the posterior third of the body; uteri parallel. Oviparous. Parasites of Chelonia.

Type species: *C. laverani* Railliet and Henry, 1912. ♂ 25–31 mm., ♀ 24–31 mm. In *Testudo emys*.

Other species:

? *C. penita* (Leidy, 1886) Barreto, 1917. In *Chrysemys scripta*, N. America.

? *C. roseus* (Leidy, 1851) Barreto, 1917. In *Testudo* spp.  
Refs. 15, 436.

#### FAMILY CRUZIIDÆ (TRAVASSOS, 1917).

Syn., *Cruzidæ* Travassos, 1917.

*Definition*.—OXYUROIDEA: mouth with three lips; vestibule present; œsophagus with a well-marked posterior bulb; intestinal diverticulum present.

#### Genus CRUZIA Travassos, 1917.

Syn., *Oxysoma* Schneider, 1866, in part.

*Definition*.—CRUZIIDÆ: mouth with three lips; well-marked chitinous vestibule armed with comb-like teeth; œsophagus cylindrical enlarged posteriorly, and followed by a well-developed bulb separated from the rest and containing a valvular apparatus; intestine with an anterior diverticulum. Male: posterior extremity conical; caudal alæ very small or absent; about nine pairs of papillæ, of which three are preanal, three adanal, and three postanal; spicules sub-equal; gubernaculum present. Female: posterior extremity tapering gradually behind the cloaca and ending in a fine point; vulva near the middle of the body; two ovaries. Oviparous, eggs with a thick rugose shell, containing an embryo when deposited. Parasites of marsupials.

Type species: *C. tentaculata* (Rud., 1819). ♂ 8–14 mm., ♀ 12–16 mm. In *Didelphys* spp.

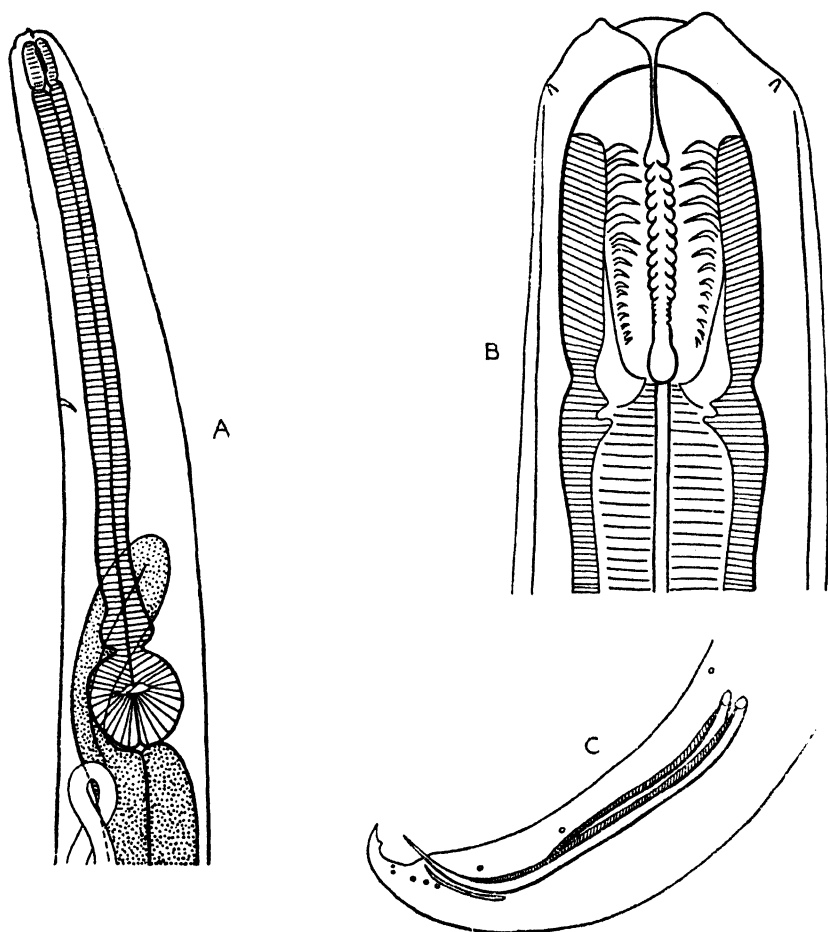


Fig. 167.—*Cruzia tentaculata*. A. Anterior extremity, lateral view.  $\times 26$ . B. Anterior extremity, ventral view.  $\times 240$ . C. Posterior extremity of male, lateral view.  $\times 84$ . (Orig.)

Syn., *Ascaris tentaculata* Rud., 1819.

*Oxysoma tentaculata* (Rud., 1819) Schneider, 1866.

Refs. 480, 631, 643.

#### FAMILY ATRACTIDÆ TRAVASSOS, 1919.

**Definition.**—OXYUROIDEA: small worms; mouth variable; œsophagus clearly divided into two parts, the posterior terminating in a bulb\* sometimes clearly separated; intestine simple without

\* In a few of the genera, viz., *Leiperenia*, *Cobboldina*, and *Monkhysterides*, the bulbar enlargement at the end of the second part of the œsophagus is not very pronounced.

diverticula. Male: without a preanal sucker; spicules equal or unequal; gubernaculum present or absent. Female: tail pointed; genitalia single (one ovary); vulva situated posteriorly. Viviparous.

## KEY TO SUBFAMILIES.

1. Males with two equal spicules and  
without a gubernaculum . . . . . Labidurinae, p. 247.
- Males with two unequal spicules . . . . . 2
2. With a gubernaculum . . . . . Atractinae, p. 244.
- Without a gubernaculum . . . . . Crossocephalinae, p. 250.

## Subfamily ATRACTINÆ Railliet, 1917.

*Definition.*—*ATRACTIDÆ*: males with two unequal spicules, and a gubernaculum.

## KEY TO GENERA.

- Mouth with six lips, anterior part of oesophagus longer than posterior; parasites of reptiles . . . . . Atractis, p. 244.
- Mouth with more than six lips, anterior part of oesophagus shorter than posterior; parasites of mammals . . . . . Leiperenia, p. 246.

## Genus ATRACTIS Duj., 1845.

*Definition.*—*ATRACTINÆ*: body cylindrical; mouth with six lips; vestibule absent; oesophagus divided into two parts, the first (longer) part thick and muscular with rounded extremities and the lumen strongly chitinized, the second part is less chitinized, narrow, and terminates in a bulb provided with a valvular apparatus. Male: posterior extremity curved spirally, tail conical; caudal alæ absent; there are a number of preanal and postanal papillæ; spicules unequal; gubernaculum present. Female: straight or bowed; tail long and pointed; vulva near anus. Viviparous. Parasites of lizards and tortoises.

Type species: *A. dactyluris* (Rud., 1819) Dujardin, 1845.

♂ 2 mm., ♀ 5–6 mm. In *Testudo græca*, etc.

Syn., *Ascaris dactyluris* Rudolphi, 1819.

Other species:

*A. fasciolata* Gendre, 1909. In *Cinixys belliana*.

*A. hystrix* (Dies., 1851). In *Podocnemis erythrocephalus*.

*A. kachugæ* Stewart, 1914. In *Kachuga lineata*.

*A. opeatura* Leidy, 1891. In *Cyclura bæolopha*.

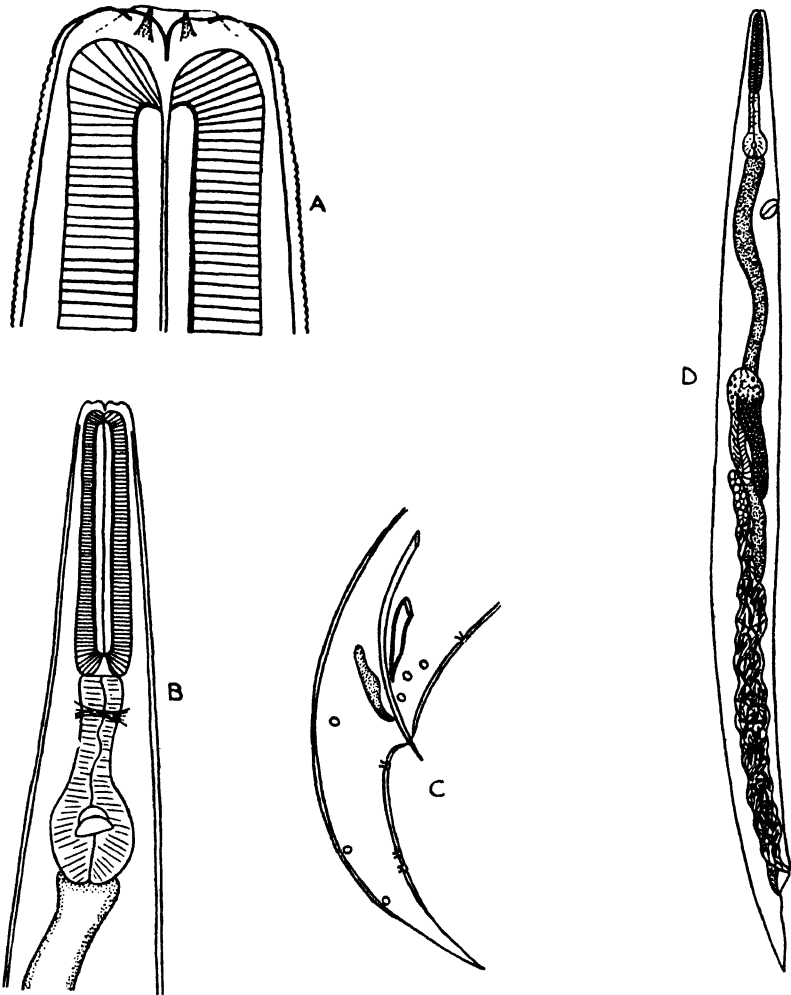


Fig. 163.—*Atractis dactyluris*. A. Head, ventral view.  $\times 400$ . B. Anterior extremity, ventral view.  $\times 90$ . C. Tail of male, lateral view.  $\times 90$ . D. Female.  $\times 28$ . (Orig.)

*A. orilleppi* Thapar, 1925. In *Podocnemis unifilis*.

*A. perarmata* Linstow, 1910. In *Cinixys belliana*.

Refs. 42, 129, 131, 151, 155, 162, 210, 313, 323, 407, 436, 591, 613c, 636.



Genus *LEIPERENIA* Khalil, 1922.

*Definition.*—*ATTRACTINÆ*: mouth surrounded by more than six lips; cervical alæ present; vestibule absent; anterior portion of œsophagus shorter than the posterior, which is slightly swollen

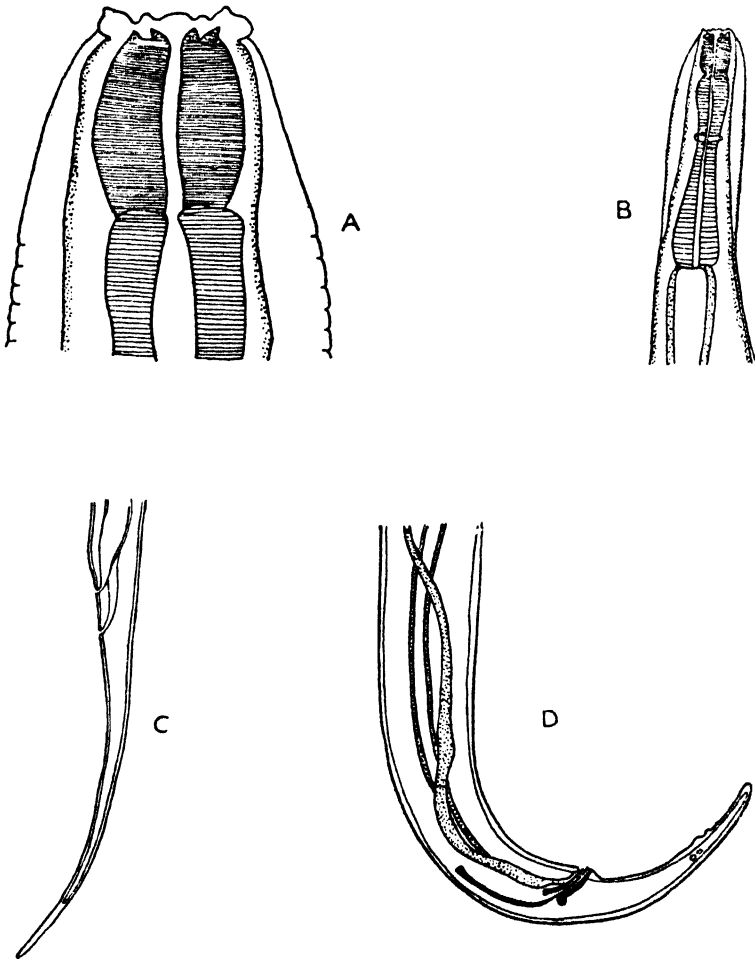


Fig. 169.—*Leiperenia leiperi*. A. Head.  $\times 180$ . B. Anterior extremity. C. Posterior extremity of female.  $\times 60$ . D. Posterior extremity of male.  $\times 60$ . (After Khalil.)

posteriorly. Male: tail incurved, long, and pointed; caudal alæ absent; four postanal papillæ; spicules unequal; gubernaculum present. Female: tail long and pointed; vulva near anus. Viviparous. Parasites of elephants.

Type species : *L. leiperi* Khalil, 1922. ♂ 3.8 mm., ♀ 3.9 mm.  
In African elephant.

Other species : *L. galebi* Khalil, 1922. In Indian elephant.  
Refs. 247, 251.

### Subfamily LABIDURINÆ \* n. sf.

*Definition.*—ATTRACTIDÆ: males with two equal spicules, and without a gubernaculum.

#### KEY TO GENERA.

1. Females with a cloaca . . . . . Rondonia, p. 248.  
Females with vulva opening separately  
from anus . . . . . 2
2. Mouth with three prominent lips, of  
which the two subventral are provided  
with a posterior fringe . . . . . Labiduris, p. 247.  
Mouth hexagonal with six small lips . . . . . Cyrtosomum, p. 249.

#### Genus LABIDURIS Schneider, 1866.

*Definition.*—LABIDURINÆ: mouth with three prominent lips, one dorsal and two subventral, the subventral are separated from the dorsal by relatively shallow notches, but from one another by a cleft extending to their bases, the median free edges are curved, overlap each other, and are fringed posteriorly; vestibule short; œsophagus consists of two parts, the posterior ending in a bulb, this is followed by a post-œsophageal bulb containing a valvular apparatus. Male: with a prominent posteriorly directed horn-like process on each side of the cloaca, and a little further back two large papillæ, in addition there are three or four pairs of pre-anal papillæ, and a similar number of postanal papillæ; the body ends in a conical pointed tail of varying length in different species; spicules equal; gubernaculum absent. Females: tail long and conical; vulva near anus. Viviparous. Parasites of tortoises.

Type species : *L. gulosa* (Rud., 1819). ♂ 6 mm., ♀ 8–12 mm.  
In *Testudo* spp., etc.

Syn., *Ascaris gulosa* Rud., 1819.

Other species :

*L. africana* Geddoelst, 1916. In *Cinixys erosa*.

† *L. zschokkei* Linstow, 1899. In *Testudo tabulata*.

Refs. 92, 151, 155, 318, 477, 480, 613c.

\* Thapar (1925) has created a new family *Labiduridæ* for the genus *Labiduris*.

† Chapin (1924) considers that *L. zschokkei* is synonymous with *L. gulosa*, but Thapar (1925) holds that they are distinct species, and that *L. africana* Geddoelst 1916, is identical with *L. zschokkei*.

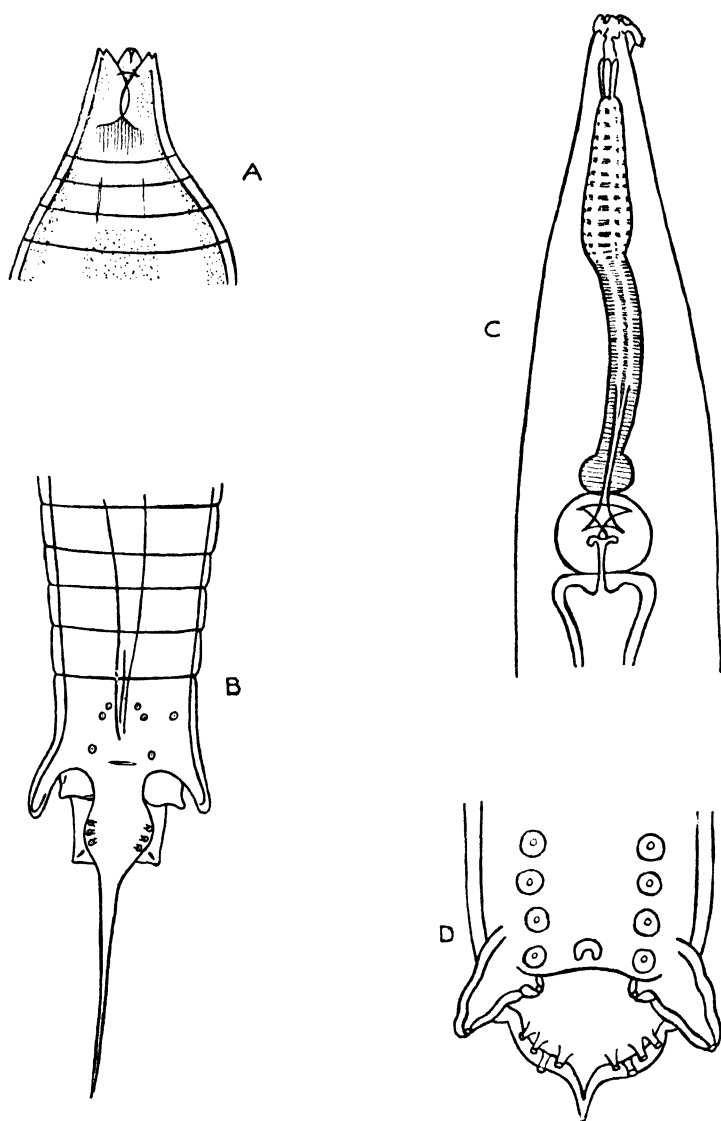


Fig. 170.—*Labiduris gulosa*. A. Head, ventral view.  $\times 130$ . B. Posterior extremity of male, ventral view.  $\times 98$ . (After Schneider.) *Labiduris africana*. C. Anterior extremity, lateral view. D. Posterior extremity of male, ventral view. (After Geddoelst.)

**Genus RONDONIA Travassos, 1919.**

*Definition*.—LABIDURINÆ: insufficiently defined; œsophagus swollen posteriorly and followed by a bulb. Male: spicules sub-

equal. Female: genitalia single; vulva opening with the anus in a cloaca. Viviparous. Parasites of fishes.

Type species: *R. rondoni* Travassos, 1919. In *Piaractus brachypomus*.

Ref. 636, 645.

Genus **CYRTOSOMUM** Gedoelst, 1919.

*Definition.*—LABIDURINÆ: mouth small and hexagonal with the greatest diameter dorso-ventral, surrounded by six insignificant lips, each with one papilla; lateral flanges absent; œsophagus

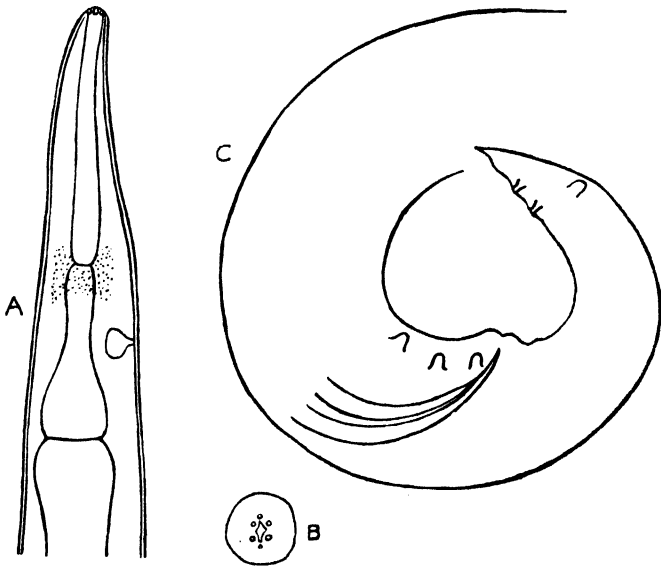


Fig. 171.—*Cyrtosomum scelopori*. A. Anterior extremity, lateral view. B. Head, end-on view. C. Posterior extremity of male, lateral view. (After Gedoelst.)

composed of two parts separated by a transverse groove, the posterior part terminates in a bulb furnished with a valvular apparatus, and is not followed by a separate bulb. The tail of both sexes is relatively short, conical, and ends in a sharp point. Male: posterior portion rolled in a spiral; caudal alæ absent; about three pairs of preanal papillæ and the same number of postanal papillæ; spicules equal and pointed; gubernaculum absent. Female: vulva a little in front of the anus. Viviparous.

Type species: *C. scelopori* Gedoelst, 1919. ♂ 2.4 mm., ♀ 2.3–2.7 mm. In *Sceloporus undulatus*.

Ref. 155.

## Subfamily CROSSOCEPHALINÆ n. sf.

*Definition.*—ATTRACTIDÆ: males with two unequal spicules, and no gubernaculum.

## KEY TO GENERA

1. Parasites of fishes . . . . . Monhysterides, p. 252.  
Parasites of mammals . . . . . 2
2. Mouth with three pairs of pectinated  
laminæ . . . . . Crossocephalus, p. 250.  
Mouth with cuticular collar and no  
laminæ . . . . . Cobboldina, p. 250.

## Genus CROSSOCEPHALUS Railliet, 1909.

Syn., *Pterocephalus* Linstow, 1899, preoccupied.

*Definition.*—CROSSOCEPHALINÆ: mouth with three lips; head with numerous papillæ; œsophagus consists of two parts, the anterior end being furnished with three pairs of pectinated laminæ capable of eversion, the posterior terminating in a subglobular bulb not followed by a separate bulb. Male: posterior extremity spiral; tail conical; caudal alæ absent; three pairs of preanal and five pairs of postanal papillæ; spicules unequal; gubernaculum absent. Female: tail long and sharply pointed; vulva near anus. Viviparous. Parasites of zebras and rhinoceroses.

Type species: *C. viviparus* (Linstow, 1899). ♂ 7–8.5 mm., ♀ 7.5–9.5 mm. In intestine of zebra.

Syn., *Pterocephalus viviparus* Linstow, 1899.

*C. zebrae* Yorke and Southwell, 1920.

Other species:

*C. brevicaudatus* Baylis and Daubney, 1923. In *Rhinoceros indicus*.

*C. longicaudatus* Baylis, 1919. In *Rhinoceros sumatrensis*.

Refs. 23, 43, 151, 318, 402a, 615, 680.

## Genus COBBOLDINA Leiper, 1911.

Syn., *Cobboldia* Leiper, 1910, preoccupied.

*Definition.*—CROSSOCEPHALINÆ: mouth with a cuticular collar prolonged laterally into two triangular flaps, the collar is supported by four papillæ, the lateral pair being twice the length of the median pair; œsophagus divided into two parts, the posterior

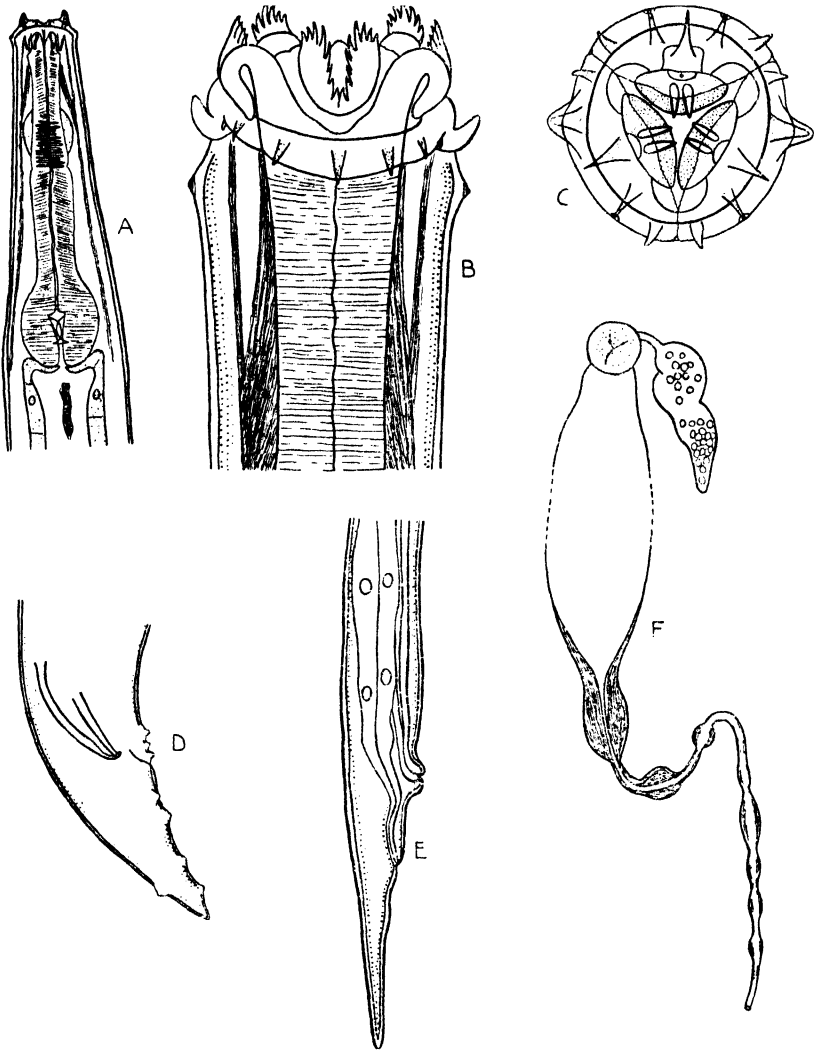


Fig. 172.—*Crossocephalus viviparus*. A. Anterior extremity, ventral view.  $\times 35$ . B. Head, dorsal view.  $\times 200$ . C. Head, end-on view.  $\times 200$ . D. Posterior extremity of male.  $\times 72$ . E. Posterior extremity of female.  $\times 60$ . F. Diagram of female genitalia. (After Yorke and Southwell.)

becoming bulbous at its extremity and not followed by a separate bulb. Tail of both sexes long and pointed. Male: posterior extremity spirally coiled; five circumanal and four postanal papillæ; spicules unequal; gubernaculum absent. Female: vulva close to anus. Viviparous. Parasites of the hippopotamus.

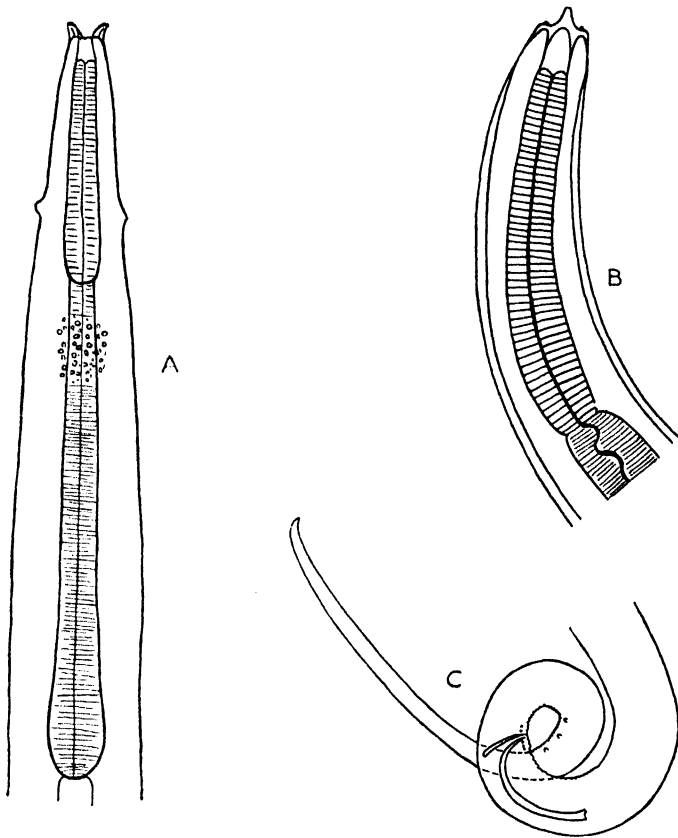


Fig. 173.—*Cobboldina vivipara*. A. Anterior extremity, ventral view.  $\times 160$ . B. Anterior extremity, lateral view.  $\times 260$ . C. Posterior extremity of male, lateral view.  $\times 90$ . (Orig.)

Type species: *C. vivipara* (Leiper, 1910). ♂ 4 mm., ♀ 4.3 mm. In hippopotamus.

Syn., *Cobboldia vivipara* Leiper, 1910.

Refs. 155, 279, 286.

**Genus MONHYSTERIDES Baylis and Daubney, 1922.**

*Definition*.—CROSSOCEPHALINÆ: mouth surrounded by six small nodules; œsophagus divided into two parts, the posterior becoming bulbous at its extremity and not followed by a separate bulb. Tail of both sexes long and pointed. Male: posterior extremity spirally coiled; nine pairs of caudal papillæ, of which four are preanal and five postanal; spicules unequal; gubernaculum absent. Female: vulva close to anus. Viviparous. Parasites of fishes.

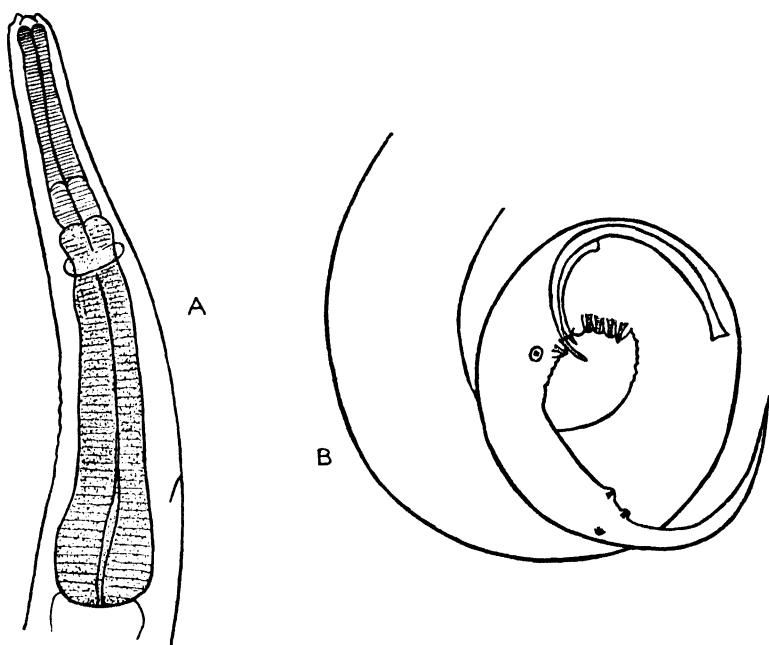


Fig. 174.—*Monhysterides piscicola*. A. Anterior extremity, lateral view.  $\times 150$ . B. Posterior extremity of male.  $\times 210$ . (After Baylis and Daubney.)

Type species : *M. piscicola* Baylis and Daubney, 1922. ♂ 3.5–4 mm., ♀ 3.7–4.4 mm. In *Barbus tor*.

Ref. 42.

### **OXYUROIDEA** insufficiently known.

Genus **STENODES** Duj., 1845.

*Definition*.—**OXYUROIDEA** : slender, filiform worms ; head small, truncated ; mouth circular in the middle of a small chitinous disc, or small buccal capsule ; cuticle transversely striated with small lateral flanges ; cesophagus slightly enlarged posteriorly, followed by a bulb containing a valvular apparatus, and clearly separated from the rest of the cesophagus. Male : posterior extremity bent ventrally ending in a fine point ; anus a little distance from tip of tail ; two pairs of small suckers in front of the anus ; spicules equal, long, and filiform. Female : tail terminating in a very fine point ; vulva in the anterior third of the body. Eggs globular, thin-shelled, containing larvæ.

Type species : *S. acus* Duj., 1845. ♂ 16.5 mm., ♀ 25 mm. From an exotic mammal.

Ref. 131.



**Superfamily ASCAROIDEA Railliet and Henry, 1915.**

*Definition.*—EUNEMATODA : usually fairly large and stout ; head bilobed or trilobed ; œsophagus frequently more or less enlarged posteriorly, but without a definite spherical posterior bulb containing a valvular apparatus (except in *Dujardinia*, where there is a small unarmed bulb), with or without a posterior ventriculus, or diverticula ; intestine with or without diverticula. Spicules equal or unequal. Females not much larger than the males. Sometimes an intermediate host is required.

**KEY TO FAMILIES.**

- Alimentary canal simple, without a post-  
œsophageal ventriculus, or œsophageal  
or intestinal diverticula . . . . . Ascaridæ, p. 254.
- Alimentary canal not simple, with a post-  
œsophageal ventriculus, and/or œso-  
phageal or intestinal diverticula . . . . . Heterocheilidæ, p. 268.
- ASCAROIDEA insufficiently known, p. 287.

**FAMILY ASCARIDÆ BAIRD, 1853.**

*Definition.*—ASCAROIDEA : head consisting of three prominent lips (or lobes) surrounding the mouth and supplied with papillæ, the dorsal lip being median and the other two submedian ; or with three main lips and three relatively prominent or inconspicuous lips (interlabia) ; without a chitinous buccal capsule or vestibule. Intestine simple, without a post-œsophageal ventriculus, or œsophageal or intestinal diverticula (occasionally in *Polydelphis* there is a rudimentary intestinal cæcum). Male : usually without caudal alæ ; two spicules usually equal or subequal ; gubernaculum sometimes present : rarely with a precloacal sucker. Female : caudal extremity usually terminating conically and fairly abruptly ; vulva usually in front of middle of body. Oviparous.

**KEY TO SUBFAMILIES.**

- Males without a precloacal sucker . . . . . Ascarinæ, p. 254.
- Males with a precloacal sucker . . . . . Ascaridiinæ, p. 266.

**Subfamily ASCARINÆ (Railliet and Henry, 1912) Travassos, 1913.**

Syn., *Askarinæ* Railliet and Henry, 1912.

*Definition.*—ASCARIDÆ : males without a precloacal sucker.

KEY TO GENERA.

- |   |   |                           |
|---|---|---------------------------|
| Interlabia present . . . . .  | 1 |                           |
| Interlabia absent . . . . .   | 4 |                           |
| 1. Males with wide caudal alæ ; only<br>four pairs of preanal papillæ ;<br>gubernaculum present . . . . . |   | Trispiculascaris, p. 263. |
| Males with caudal alæ narrow<br>or absent ; numerous preanal<br>papillæ ; gubernaculum absent . . . . .   | 2 |                           |
| 2. Behind lips is a cuticular ring from<br>which interlabia arise . . . . .                               |   | Lagochilascaris, p. 260.  |
| Cuticular ring absent . . . . .   | 3 |                           |
| 3. Lips with a deep groove extending<br>more or less horizontally round<br>their inner surfaces . . . . . |   | Parascaris, p. 261.       |
| Lips without the above character . . . . .  |   | Ophidascaris, p. 262.     |
| 4. Females with more than two uterine<br>tubes . . . . .  | 5 |                           |
| Females with only two uterine tubes . . . . .   | 6 |                           |
| 5. With four uterine tubes . . . . .  |   | Polydelphis, p. 265.      |
| With six uterine tubes . . . . .  |   | Hexametra, p. 266.        |
| 6. Males with wide caudal alæ ; pre-<br>anal papillæ few in number and<br>pedunculated . . . . .          |   | Orneoascaris, p. 264.     |
| Males without, or with narrow,<br>caudal alæ ; preanal papillæ<br>numerous . . . . .                      | 7 |                           |
| 7. Cervical alæ absent . . . . .  |   | Ascaris, p. 255.          |
| Cervical alæ present . . . . .  | 8 |                           |
| 8. Tail of male probular ; spicules<br>winged ; egg shell with mosaic<br>marking . . . . .                |   | Toxocara, p. 257.         |
| Tail of male not probular ; spicules<br>not winged ; egg shell smooth . . . . .                           |   | Toxascaris, p. 258.       |

Genus ASCARIS Linnæus, 1758.

Syn., *Fusaria* Zeder, 1800.

*Stomachida* Pereboom, 1780.

*Lombricoides* Méral, 1821.

*Definition.*—ASCARINÆ: lips with dentigerous ridges ; interlabia absent ; cervical alæ absent. Male : tail conical without caudal alæ ; with numerous preanal papillæ and few postanal papillæ ; spicules equal, not winged ; gubernaculum absent.

Female: vulva anterior to the middle of the body; vagina directed backwards; two uterine tubes. Oviparous, eggs with a thick smooth shell surrounded by an albuminous coat with a coarsely granular surface, and containing an unsegmented ovum when deposited. Parasites of mammals.

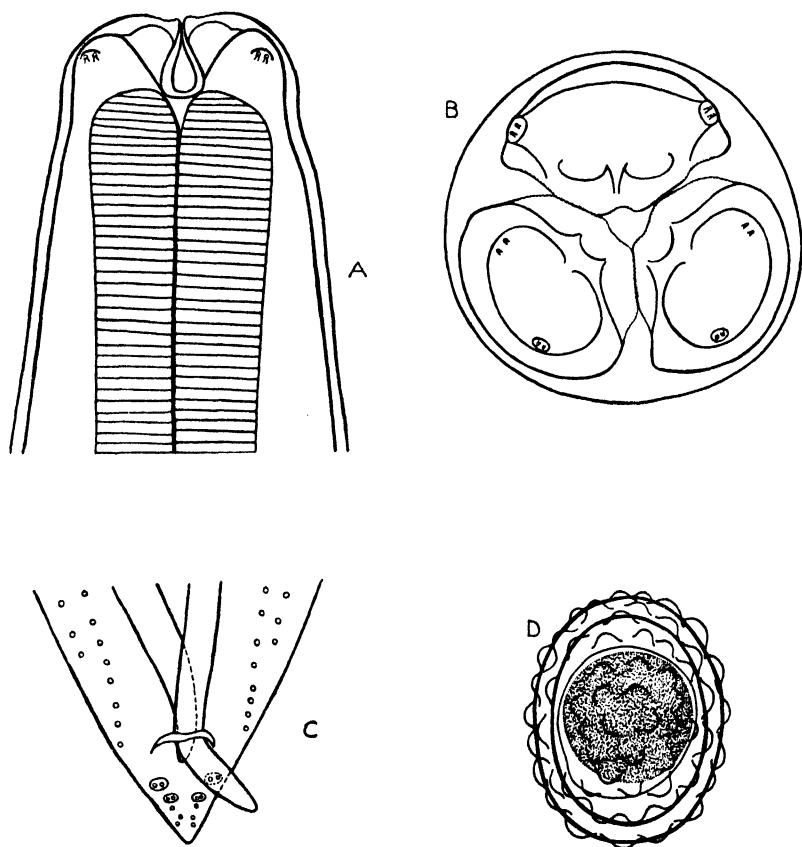


Fig. 175.—*Ascaris lumbricoides*. A. Anterior extremity, ventral view.  $\times 46$ . B. Head, end-on view.  $\times 56$ . C. Posterior extremity of male, ventral view.  $\times 45$ . D. Egg.  $\times 500$ . (Orig.)

Type species: *A. lumbricoides* Linnæus, 1758. ♂ 150–250 mm., ♀ 200–400 mm. In man, monkey, squirrel, and pig.

Syn., *Fusaria lumbricoides* (Linn., 1758).

*Stomachida pereboomii* Gœze, 1782.

*Lombricoides vulgaris* Mérat, 1821.

*A. suum* Gœze, 1782.

*A. suilla* Duj., 1845.

? *A. texana* Smith and Goeth, 1904.

Other species :

*A. columnaris* (Leidy, 1856). In *Mephitis* sp.

*A. dasypodina* Baylis, 1922. In armadillo.

\**A. ovis* Rud., 1819. In sheep.

*A. phacochæri* Gedoelst, 1916. In *Phacochærus africanus*.

†*A. vitulorum* Goeze, 1782. In cattle.

Refs. 5, 28, 31, 42, 69, 196, 436, 597a, 602, 618, 620, 681.

Genus **TOXOCARA** Stiles, 1905.

Syn., *Belascaris* Leiper, 1907.

*Definition*.—ASCARINÆ: lips with pulp forming very distinctly two lateral lobes, separated by a deep sinus, and a single inter-

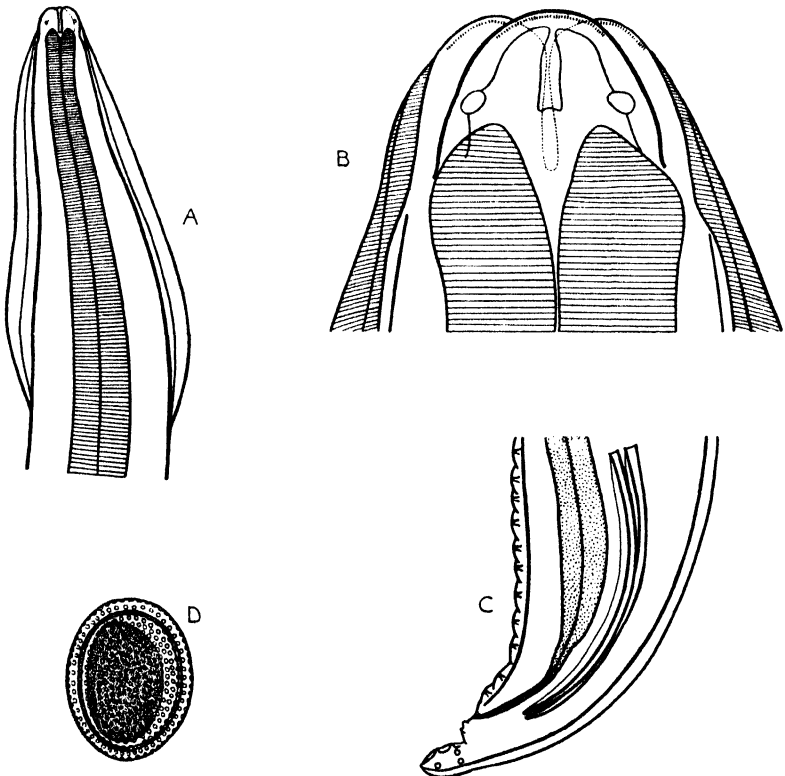


Fig. 176.—*Toxocara canis*. A. Anterior extremity, ventral view.  $\times 28$ . B. Head, dorsal view.  $\times 160$ . C. Posterior extremity of male, lateral view.  $\times 56$ . D. Egg.  $\times 250$ . (Orig.)

\* Probably identical with *A. lumbricoides*.

† In this species the cesophagus is modified posteriorly into a small almost globular ventriculus which is, however, not clearly constricted off from the muscular portion of the cesophagus.

mediate lobe, the lateral lobes contract anteriorly and terminate in a digitiform process the extremity of which is bent inwards towards that of the opposite side; fine dentigerous ridges sometimes present; interlabia absent; cervical alæ present; oesophagus with a distinct posterior muscular ventriculus. Male: posterior extremity probular; caudal alæ absent; a group of five papillæ on each side of the conical tail, a double subventral papilla on each side behind the cloaca and in front of the tail, and a row of about twenty preanal papillæ on each side; spicules subequal and winged; gubernaculum absent. Female: vulva in the anterior fourth of the body; vagina directed backwards; two uterine tubes. Oviparous, eggs with a corrugated shell. Parasites of carnivora and elephants.

Type species: *T. canis* (Werner, 1782). ♂ 50–90 mm., ♀ 50–170 mm. In dogs.

Syn., *Lumbricus canis* Werner, 1782.

*Ascaris wernerii* Rud., 1793.

*Ascaris marginata* Rud., 1802.

*Belascaris marginata* (Rud., 1802) Railliet and Henry, 1911.

Other species:

*T. crenulata* (Bremser, 1824). In *Felis onça*.

*T. lonchoptera* (Dies., 1851). In elephants.

*T. masculior* (Railliet and Henry, 1911). In *Fennecus zerda*.

*T. melis* (Geddoelst, 1920). In the badger.

*T. mystax* (Zeder, 1800). In *Felis* spp.

Syn., *Fusaria mystax* Zeder, 1800.

*Ascaris cati* Schrank, 1788, in part.

*Ascaris leptoptera* Rud., 1809, in part.

*Ascaris alata* Bellingham, 1839.

*Belascaris mystax* (Zeder, 1800) Leiper, 1907.

*T. vulpis* (Frölich, 1789). In *Vulpes vulpes* [possibly identical with *T. canis*].

Syn., *T. triquetra* (Schrank, 1790).

Refs. 42, 251, 273, 430, 583, 596, 597a, 599, 609, 681.

Genus **TOXASCARIS** Leiper, 1907.

*Definition*.—**ASCARINÆ**: lips resembling those of *Toxocara*, but with the anterior lobules of pulp clearly separated from the lobes by a deep furrow and enlarged and bilobed at their extremity; fine dentigerous ridges present; interlabia absent; cervical alæ present; oesophagus without a posterior muscular ventriculus. Male: posterior extremity not probular but tapering gradually;

caudal alæ absent ; a group of five postanal papillæ and a double subventral papilla on each side behind the cloaca, and a row of at least twenty-five simple preanal papillæ ; spicules subequal not winged ; gubernaculum absent. Female : vulva towards the

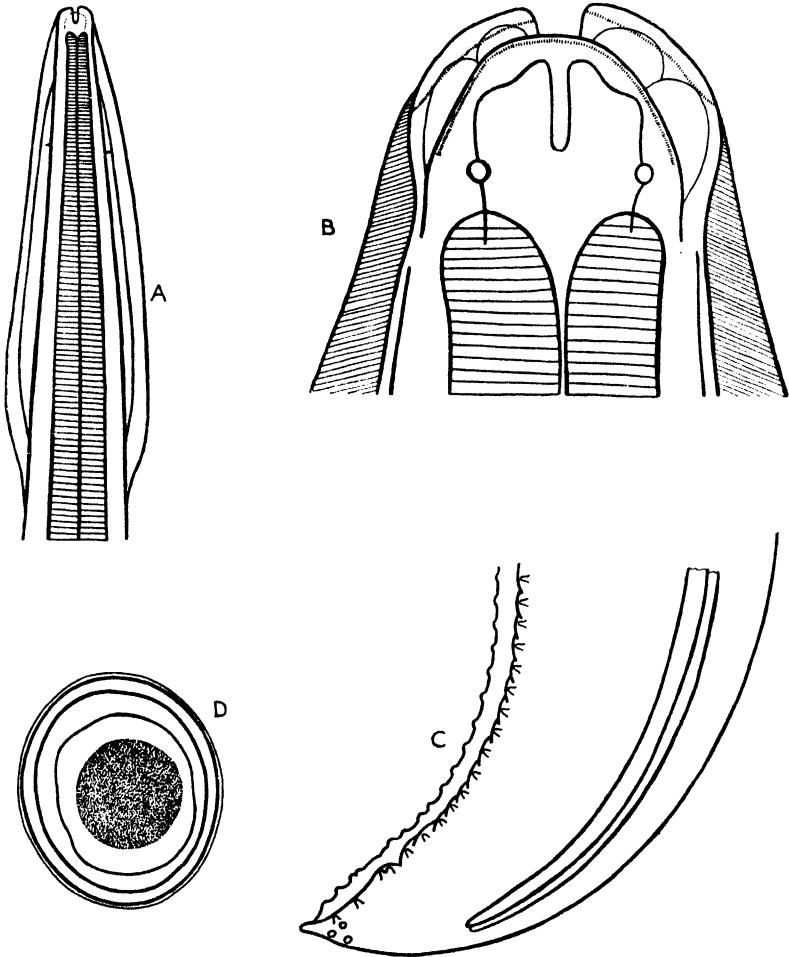


Fig. 177.—*Toxascaris leonina*. A. Anterior extremity, ventral view.  $\times 24$ . B. Head, dorsal view.  $\times 215$ . C. Posterior extremity of male, lateral view.  $\times 75$ . D. Egg.  $\times 350$ . (Orig.)

anterior third of the body ; vagina directed backwards ; two uterine tubes. Oviparous, eggs with a thick smooth shell. Parasites of carnivora.

Type species : *T. leonina* (Linstow, 1902). ♂ 20–70 mm., ♀ 22–80 mm. In carnivora.

Syn., *Ascaris leonina* Linstow, 1902.

*Ascaris cati* Schrank, 1788, in part.

*Ascaris leptoptera* Rud., 1809, in part.

*Toxascaris limbata* Railliet and Henry, 1911.

*Toxascaris marginata* (Rud., 1802) of Leiper, 1907.

*Ascaris microptera* (Rud., 1819).

Other species :

*T. transfuga* (Rud., 1819). In *Ursus* sp., etc.

Refs. 42, 273, 322, 430, 583, 597a, 609.

Genus **LAGOCHILASCARIS** Leiper, 1909.

*Definition.*—**ASCARINÆ**: lips with a strongly-developed cuticular covering obscuring the pulp and separated off from the body by a deep groove behind which is a cuticular ring from which arise

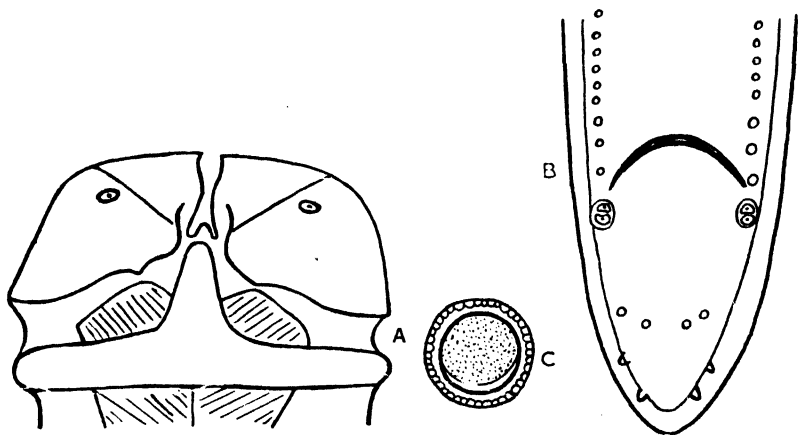


Fig. 178.—*Lagochilascaris minor*. A. Head, ventral view. *Lagochilascaris major*. B. Tail of male. C. Egg. (After Leiper.)

three subsidiary lips (interlabia), the inner surface of each of the main lips is split vertically, giving the appearance of hare-lips; narrow lateral flanges extending the whole length of the body. Male: posterior extremity bluntly conical; caudal alæ absent; about five pairs of postanal papillæ, and at least twenty-four pairs of preanal papillæ; spicules subequal not winged. Female: vulva slightly in front of the middle of the body; vagina directed forwards; two uterine tubes. Oviparous, eggs spherical, shells thick with mosaic markings. Parasites of carnivora.

Type species: *L. minor* Leiper, 1909. ♂ 9 mm., ♀ 15 mm. In subcutaneous abscess of man, normal site probably intestine of *Felis* spp.

Other species : *L. major* Leiper, 1910. In African lion.

*L. turgida* (Stoss., 1902). In *Didelphys crassicaudata*.

Refs. 276, 280, 281, 291, 597a, 647a.

Genus **PARASCARIS** n. g.

*Definition*.—**ASCARINÆ** : lips quadrangular, the internal surface being provided with a transparent membrane bordered by

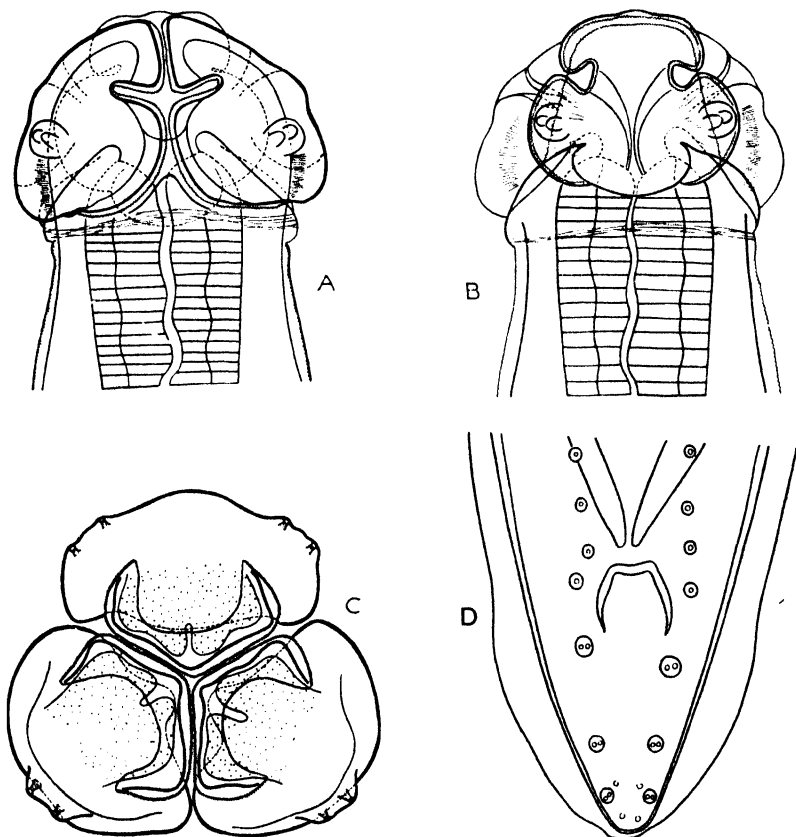


Fig. 179.—*Parascaris equorum*. A. Anterior extremity, ventral view.  $\times 42$ .  
B. Anterior extremity, dorsal view.  $\times 42$ . C. Head, end-on view.  
 $\times 56$ . D. Posterior extremity of male, ventral view.  $\times 35$ . (Orig.)

dentigerous ridges ; on the median surface of each lip is a deep fissure, which runs more or less horizontally round the internal surface of the lip, but is not continued over the external surface ; the dorsal lip bears two large double papillæ and each subventral lip one large double papilla ; small interlabia present ; cervical



alæ absent. Male: posterior extremity rounded or bluntly conical; small caudal alæ present; about six pairs of postanal papillæ and numerous preanal papillæ arranged in three longitudinal subventral rows on each side; spicules equal and not winged; gubernaculum absent. Female: posterior extremity rounded and ending in a short conical process; vulva somewhat posterior to the middle of the body. Oviparous, eggs finely punctate.

Type species: *P. equorum* (Gœze, 1782). ♂ 15–27 cm., ♀ 18–37 cm. In equines.

Syn., *Ascaris equorum* Gœze, 1782.

*Ascaris equi* Schrank, 1788.

*Ascaris megalcephala* Cloquet, 1824.

Other species: ? *P. zebrae* (Skrjabin, 1916). In zebras.

Syn.,\* *Ascaris zebrae* Skrjabin, 1916.

Refs. 186, 481, 573.

**Genus OPHIDASCARIS Baylis, 1921.**

*Definition.*—ASCARINÆ: lips almost square, with more or less rounded angles and about as broad as long; dentigerous ridges

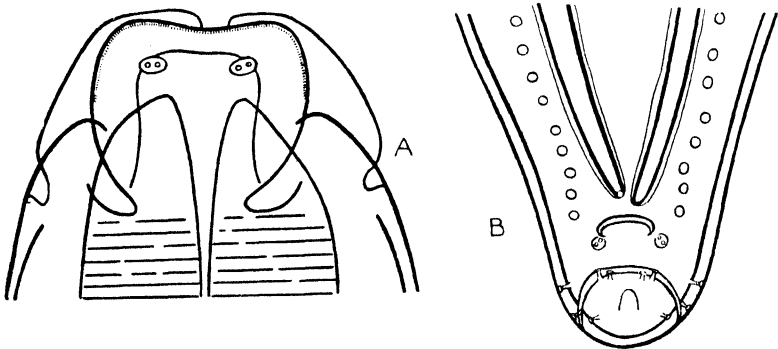


Fig. 180.—*Ophidascaris filaria*. A. Head, dorsal view.  $\times 160$ . B. Posterior extremity of male, ventral view.  $\times 56$ . (Orig.)

present; interlabia present; from the interlabia deep transverse grooves in the cuticle run partially round the bases of the main lips; genital tubes in both sexes usually confined to the posterior region of the body, which often shows a fusiform thickening. Male: tail bluntly conical; caudal alæ absent or rudimentary; numerous preanal papillæ; spicules equal or subequal; gubernaculum absent. Female: vulva usually behind the middle of

\* Possibly young forms of *P. equorum*.

the body ; vagina directed backwards ; two uterine tubes. Oviparous, eggs with a punctate shell. Parasites of snakes and lizards.

Type species : *O. filaria* (Duj., 1845). ♂ 110 mm., ♀ 170 mm. In *Python* sp. and *Varanus* sp.

Syn., *Ascaris filaria* Dujardin, 1845.

*Ascaris rubicunda* Schneider, 1866.

? *Ascaris infundibulicola* Linst., 1903.

Other species :

*O. gestri* (Parona, 1890). In *Tropidonotus* sp.

*O. intorta* (Gedoelst, 1916). In *Bitis* sp.

*O. mombasica* Baylis, 1921. In *Psammophis* sp.

*O. naiæ* (Gedoelst, 1916). In *Naja* sp.

*O. obconica* (Baird, 1860). In *Helicops* sp.

*O. papillifera* (Linstow, 1898). In snakes.

*O. radiosa* (Schneider, 1866). In *Bitis* sp.

*O. solitaria* (Linstow, 1903). In *Dipsadomorphus* sp.

Refs. 29, 131, 151, 324, 480, 597a.

**Genus TRISPICULASCARIS Skrjabin, 1916.**

*Definition*.—ASCARINÆ: lips prominent with auricular outgrowths at their sides and with dentate margins ; interlabia

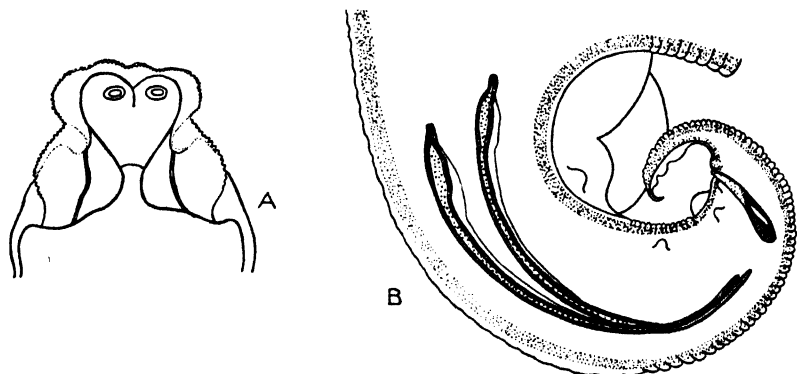


Fig. 181.—*Trispiculascaris trispiculascaris*. A. Head, dorsal view. B. Posterior extremity of male, lateral view. (After Skrjabin.)

present. Male : tail strongly bent with well-marked alæ ; preanal and postanal papillæ arranged in a row on each side and few in number ; spicules long, delicate, and equal ; gubernaculum present. Female : tail straight and conically pointed ; vulva in the anterior half of the body. Parasites of reptiles.

Type species : *T. trispiculascaris* Travassos, 1920. ♂ 6–8 mm., ♀ 13–28 mm. In crocodiles.

Syn., *T. helicina* (Molin, 1860), of Skrjabin, 1916.

Refs. 36, 42, 128, 573, 597a, 639.

Genus **ORNEOASCARIS** Skrjabin, 1916.

*Definition.*—ASCARINÆ : lips large and hexagonal with dentate margins ; interlabia absent ; œsophagus and intestine simple. Male : posterior extremity not strongly bent, the ventral surface

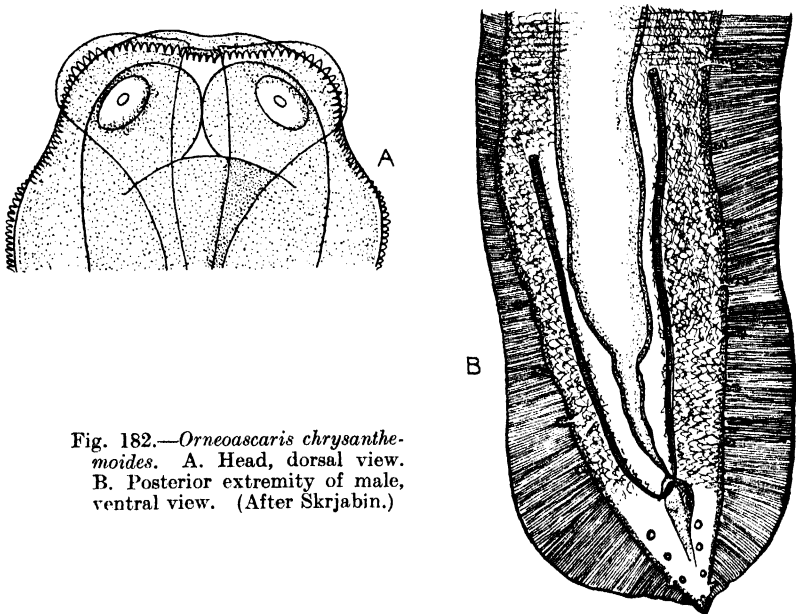


Fig. 182.—*Orneoscaris chrysanthemoides*. A. Head, dorsal view. B. Posterior extremity of male, ventral view. (After Skrjabin.)

of the tail is marked both in longitudinal and transverse directions with a series of furrows which form a fine mosaic network of stellate loops ; wide caudal alæ ; preanal papillæ few in number (about seven), pedunculated, and with their free ends exhibiting the appearance of a double flower ; postanal papillæ sessile ; spicules thin and equal ; gubernaculum absent. Female : tail bluntly rounded ; vulva in the anterior half of the body. Oviparous, eggs large and oval. Parasites of amphibia.

Type species : *O. chrysanthemoides* Skrjabin, 1916. ♂ 23–30 mm., ♀ 68.5–85 mm. In *Bufo* sp.

Refs. 573, 597a.

Genus **POLYDELPHIS** Duj., 1845.

*Definition.*—**ASCARINÆ**: lips oblong or more or less hexagonal, frequently longer than broad, with two papillæ (simple or double) on the dorsal and one on each subventral lip; interlabia absent; no groove at the base of the lips; œsophagus short without a bulb or ventriculus; a rudimentary intestinal cæcum sometimes

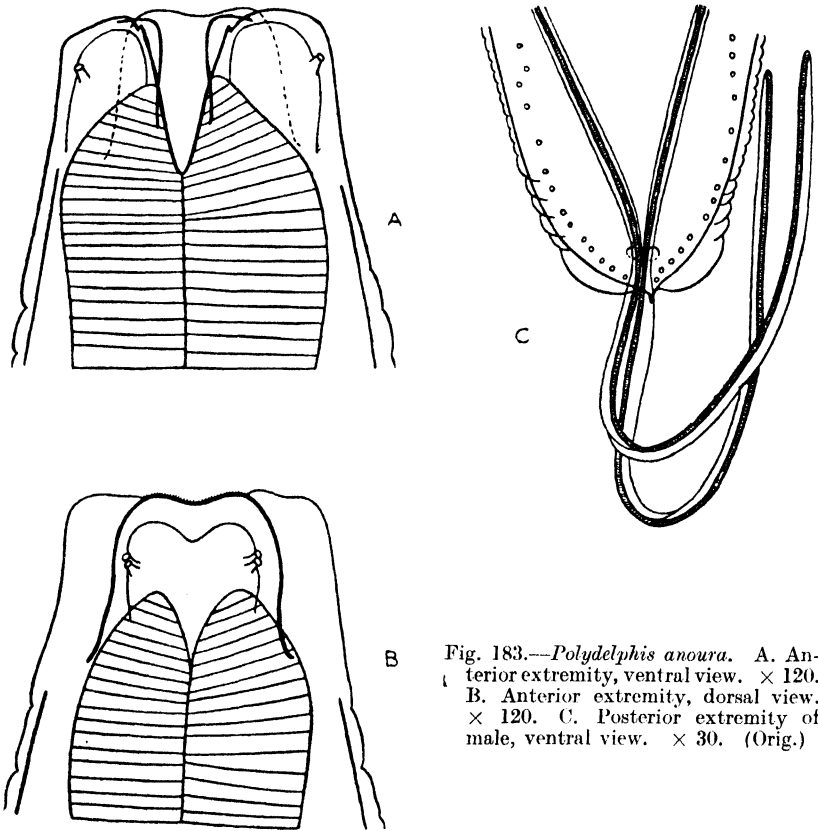


Fig. 183.—*Polydelphis anoura*. A. Anterior extremity, ventral view.  $\times 120$ . B. Anterior extremity, dorsal view.  $\times 120$ . C. Posterior extremity of male, ventral view.  $\times 30$ . (Orig.)

present. Male: tail blunt; spicules equal; gubernaculum absent. Female: vulva usually in the anterior region of the body, rarely behind the middle; vagina directed posteriorly; four to six uterine tubes. Parasites of snakes and lizards.

Type species: *P. anoura* Duj., 1845. ♂ 116 mm., ♀ 144 mm. In *Python* spp., etc.

Syn., *Ascaris attenuata* Molin, 1858, of Linstow, 1899.

*Ascaris attenuata* Molin, 1858, of Stossich, 1896, in part.

*Ascaris pythonis* Retzius, 1830, of Railliet and Henry, 1910, in part.

Other species :

*P. attenuata* (Molin, 1858). In *Python* spp., *Bitis* sp.

*P. boddaërtii* (Baird, 1860). In *Drymobius boddaërti*.

*P. hexauterina* Skrjabin, 1916. In *Bothrops* sp.

*P. hexametra* (Gedoelst, 1916). In *Chamæleon dilepis*.

*P. oculata* (Linstow, 1899). In *Python* sp.

*P. quadricornis* (Wedl, 1862). In *Naja* spp., *Bitis* sp., etc.

*P. sewelli* Baylis and Daubney, 1922. In *Cælopettis* sp.

*P. waterstoni* Baylis, 1921. In *Zamenis* sp.

Refs. 29, 131, 355, 574, 597a, 636.

#### Genus **HEXAMETRA** Travassos, 1919.

*Definition*.—This genus was created for the members of the genus *Polydelphis* which contain six uterine branches. If this be accepted, it would contain the species *hexametra*, *boddaërtii*, *quadricornis*, *sewelli*, *waterstoni*, and *hexauterina*.

Refs. 597a, 636.

#### Subfamily **ASCARIDIINÆ** Travassos, 1919.

*Definition*.—**ASCARIDÆ**: male with a preloacal sucker with a chitinous rim.

#### Genus **ASCARIDIA** Duj., 1845.

Syn. ? *Ascarida* Mueller, 1880.

*Definition*.—**ASCARIDIINÆ**: generally with cuticular lateral flanges; œsophagus club-shaped, but without a posterior bulb. Male: preanal sucker slightly prominent with a chitinous rim; caudal alæ narrow; papillæ relatively large; spicules equal or subequal; gubernaculum absent. Female: vulva near the middle of the body; uteri opposed. Oviparous, eggs with a thick shell. Parasites of birds and perhaps of reptiles and fishes.

Type species: *A. hermaphrodita* (Frölich, 1789). ♂ 52 mm., ♀ 63 mm. In *Psittacus* sp.

Syn., *Ascaris hermaphrodita* Froel., 1789.

*Fusaria truncata* Zeder, 1803.

Other species :

*A. ægyptiaca* (Linst., 1902). In *Ardea* sp.

*A. amblymorpha* (Drasche, 1883). In *Caprimulgus* sp.

Syn., *Heteracis amblymorpha* Drasche, 1883.

*A. anseris* Schwartz, 1925. In *Anser domesticus*.

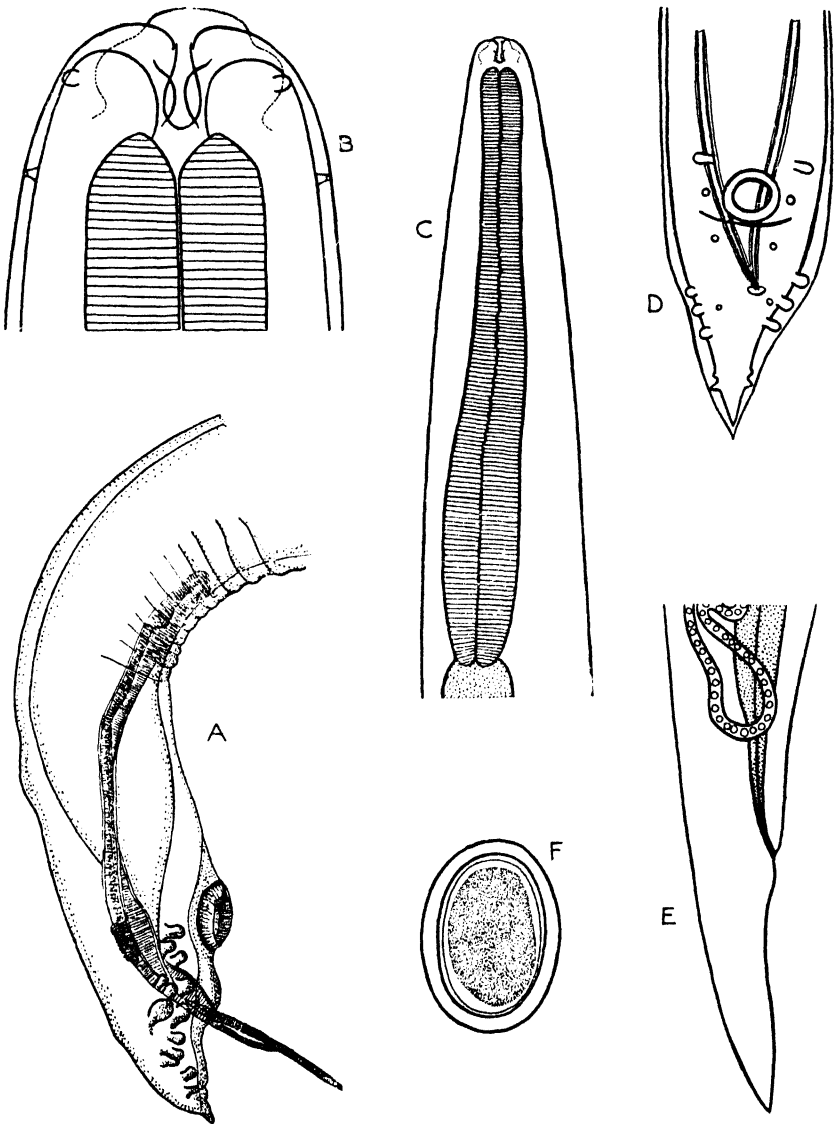


Fig. 184.—*Ascaridia hermaphrodita*. A. Posterior extremity of male, lateral view. (After Skrjabin.) *Ascaridia perspicillum*. B. Head, ventral view.  $\times 96$ . C. Anterior extremity, ventral view.  $\times 37$ . D. Posterior extremity of male, ventral view.  $\times 46$ . E. Posterior extremity of female.  $\times 23$ . F. Egg.  $\times 333$ . (Orig.)

*A. australis* (Linst., 1898). In *Macropygia* sp.

*A. borealis* (Linst., 1884). In *Lagopus* sp.

*A. brasiliiana* (Linst., 1899). In *Perdix* sp., *Rhynchotus* sp.

- A. brasiliensis* (Magalhães, 1892). In *Gallus* sp.  
*A. brevicauda* (Rätz, 1897). In *Lucioperca* sp.  
*A. calcarata* (Gendre, 1909). In *Numida meleagris*.  
*A. catheturina* (Johnst., 1912). In *Talegallus* sp.  
*A. circularis* (Linst., 1903). In *Centropus* sp.  
*A. columbæ* (Gmel., 1790.) In *Columba* sp.  
*A. compar* (Schränk, 1790). In *Tetraonidæ* sp.  
*A. compressa* (Schneid., 1866). In *Gallus* sp.  
*A. cordata* (Linst., 1906). In *Callipepla squamata*.  
*A. cristata* (Linst., 1901). In *Balearica* sp.  
*A. cylindrica* (Blome, 1909). In *Tetrao* sp.  
*A. dolichocerca* (Stoss., 1902). In *Circus* sp.  
*A. fasciata* Baylis, 1920. In *Vinago delalandii*.  
*A. flexuosa* (Schneid., 1866). In *Crotalus* sp.  
*A. francolina* (Linst., 1899). In *Francolinus* sp.  
*A. granulosa* (Linst., 1906). In *Gallus* sp.  
*A. lineata* (Schneid., 1866). In *Anas* sp., *Gallus* sp.  
 Syn., *A. hamia* Lane, 1914.  
*A. longecirrata* (Linst., 1879). In *Geopelia* sp.  
*A. maculosa* (Rud., 1802). In *Columba* sp., *Stictænas* sp.,  
*Vinago* sp.  
*A. magalhãesi* Trav., 1913. In *Geotrygon* sp.  
*A. magnipapilla* (Linst., 1906). In *Lyrurus* sp.  
*A. orthocerca* (Stoss., 1902). In *Rhea* sp.  
*A. perspicillum* (Rud., 1803). In domestic fowl.  
 Syn., *Ascaris inflexa* Zeder, 1800, of Rud., 1819.  
*A. pterophora* (Crep., 1854). In *Cariamã* sp.  
*A. serrata* (Schneid., 1866). In *Penelope* sp.  
*A. strelnikowi* Skrjabin, 1916. In *Tinamus* sp.  
*A. stroma* (Linst., 1899). In *Grus* sp.  
*A. styphlocerca* (Stoss., 1904). In ducks.  
*A. trilabium* (Linst., 1904). In *Centropus* sp.  
 Refs. 26, 42, 72, 131, 441, 481c, 481e, 574, 620, 621, 636, 682.

#### FAMILY HETEROCHEILIDÆ RAILLIET AND HENRY, 1915.

*Definition.*—ASCAROIDEA : head consisting of three large lips ; alimentary canal not simple. The cesophagus may or may not be divided into an anterior muscular portion and a posterior ventriculus of different histological structure ; when the latter is absent (and frequently when it is present) there is an anterior cæcum springing from the intestine and lying alongside the cesophagus ; a posterior cæcum or solid glandular appendix may

also be developed in connection with the ventricular portion of the œsophagus.

## KEY TO SUBFAMILIES.

1. Cuticle without spines or other raised structures . . . . . Anisakinae, p. 271.  
Cuticle with spines or other raised structures . . . . . 2
2. Cuticle with annular thickenings  
spined posteriorly . . . . . Gœziinae, p. 284.  
Cuticle without annular thickenings . . . . . 3
3. Behind lips is a collar consisting of a double row of fimbriæ . . . . . Crossophorinae, p. 286.  
Behind lips is a cuticular swelling consisting of a series of longitudinal ribs . . . . . Heterocheilinae, p. 269.

## Subfamily HETEROCHEILINÆ Railliet and Henry, 1912.

*Definition.*—HETEROCHEILIDÆ: behind the lips is a cuticular swelling consisting of a series of longitudinal ribs.

## KEY TO GENERA.

- Vulva near anus . . . . . Heterocheilus, p. 269.  
Vulva in front of middle of body . . . . . Typhlophorus, p. 271.

## Genus HETEROCHEILUS Diesing, 1839.

Syn., *Lobocephalus* Diesing, 1838. [nomen nudum.]

*Definition.*—HETEROCHEILINÆ: mouth surrounded by three prominent complex lips each of which sends a tongue-like prolongation backwards, these processes are united by membranes which are thrown into longitudinal folds; œsophagus cylindrical slightly enlarged posteriorly; from the anterior end of the intestine a long cæcum is directed forwards and reaches almost to the anterior end of the worm. Male: posterior extremity almost straight, conical, and ending in a sharp point; three pairs of preanal and five pairs of postanal papillæ; spicules equal, long, and winged. Female: posterior extremity long and conical; vulva near anus. Oviparous, eggs oval and unsegmented when deposited. Parasites of Sirenia.



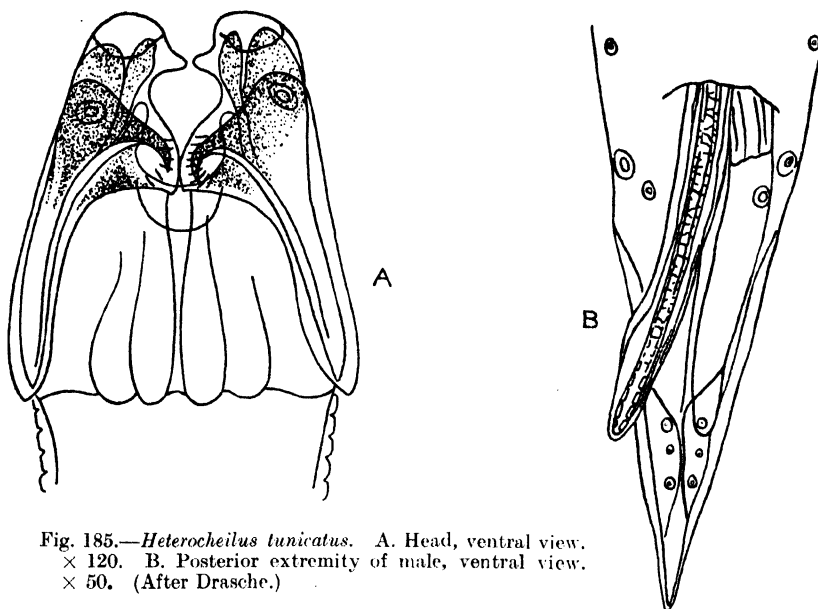


Fig. 185.—*Heterocheilus tunicatus*. A. Head, ventral view.  
 × 120. B. Posterior extremity of male, ventral view.  
 × 50. (After Drasche.)

Type species: *H. tunicatus* Diesing, 1839. ♂ 25–30 mm.,  
 ♀ 25–37 mm. In *Manatus exunguis*.

Syn., *Lobocephalus heterolobus* Diesing, 1838. [nomen nudum  
 except for host.]

Refs. 28, 122, 128, 436.

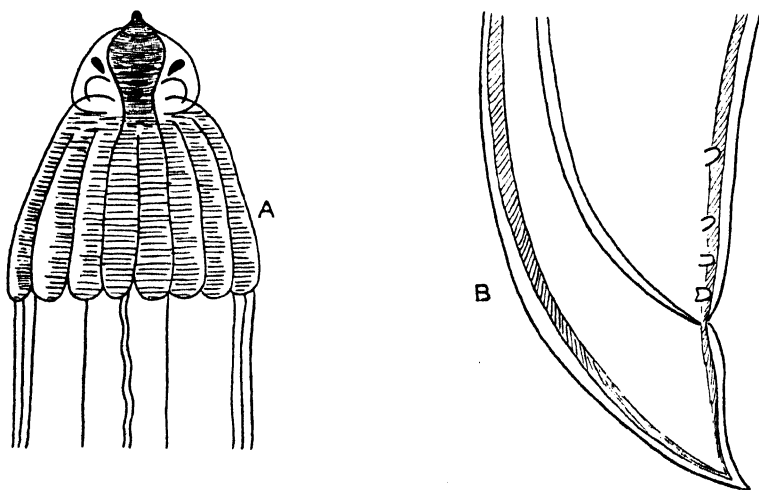


Fig. 186.—*Typhlophorus lamellaris*. A. Anterior extremity, dorsal view.  
 B. Posterior extremity of male, lateral view. (After Linstow.)

Genus **TYPHLOPHORUS** Linstow, 1906.

*Definition.*—**HETEROCHEILINÆ**: mouth with three triangular lips behind which is a cuticular thickening consisting of longitudinal ribs; cuticle smooth with lateral flanges; anterior cæcum from the intestine running right to the anterior end of the body. Male: four pairs of preanal papillæ; spicules equal. Female: tail bent dorsally; two rounded projections in front of the anus; vulva just in front of the middle of the body. Oviparous, eggs with a thick shell.

Type species: *T. lamellaris* Linstow, 1906. ♂ 11 mm., ♀ 16 mm. In *Gavialis gangeticus*.

Refs. 28, 327, 436.

Subfamily **ANISAKINÆ** Railliet and Henry 1912.

*Definition.*—**HETEROCHEILIDÆ**: cuticle not provided with spines or other raised structures.

KEY TO GENERA.

- |  |                        |
|--|------------------------|
| Œsophagus with a posterior ventriculus; intestinal cæcum present or absent . . . . . | 1                      |
| Œsophagus without a posterior ventriculus; intestinal cæcum present                  | 6                      |
| 1. With an intestinal cæcum . . . . .  | 2                      |
| Without an intestinal cæcum . . . . .  | 4                      |
| 2. With one œsophageal appendix . . . . .  | 3                      |
| With several œsophageal appendices . . . . .   | Multicæcum, p. 283.    |
| Without an œsophageal appendix . . . . .   | Porrocæcum, p. 279.    |
| 3. Lips with teeth; interlabia absent; collar round neck . . . . .                   | Clœoascaris, p. 283.   |
| Lips without teeth; interlabia present without cervical collar . . . . .             | Contracæcum, p. 281.   |
| 4. With œsophageal appendix . . . . .  | Raphidascaris, p. 274. |
| Without an œsophageal appendix . . . . .   | 5                      |
| 5. Interlabia absent; dentigerous ridges present . . . . .                           | Anisakis, p. 272.      |
| Interlabia present; dentigerous ridges absent . . . . .                              | Paranisakis, p. 274.   |

6. With a small muscular œsophageal bulb . . . . . Dujardinia, p. 275.  
 Without a muscular œsophageal bulb 7  
 7. With small interlabia . . . . . Amplicœcum, p. 278.  
 Without small interlabia . . . . . Angusticœcum, p. 279.

Genus **ANISAKIS** Duj., 1845.

Syn., *Peritrachelius* Dies., 1851.

*Conocephalus* Dies., 1861, not Thunb., 1812.

*Definition*.—ANISAKINÆ: interlabia absent; dentigerous ridges present; œsophagus with an anterior muscular portion and a posterior ventriculus, the latter being oblong or sigmoid in shape

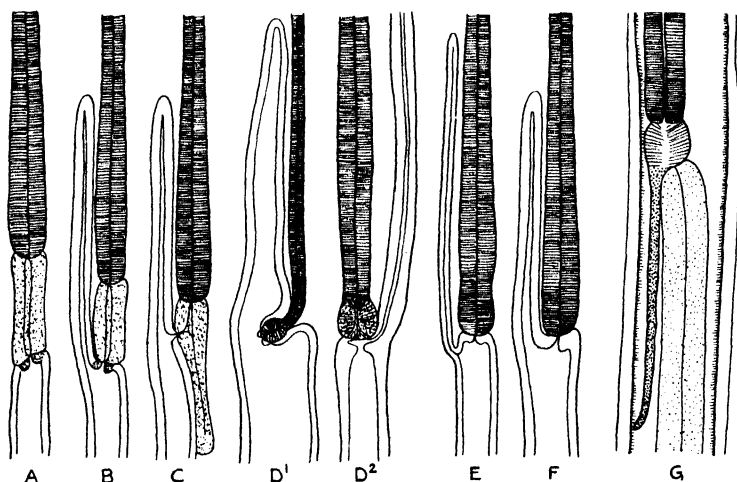


Fig. 187.—Diagram illustrating types of structures met with in the alimentary canal of various *Anisakinæ*. A. *Anisakis*. B. *Porrocœcum*. C. *Contracœcum*. D. *Dujardinia* (D¹, *D. helicina*; D², *D. halicoris*). E. *Angusticœcum*. F. *Amplicœcum* (After Baylis.) G. *Raphidascaris*. (Orig.)

and clearly marked off from the muscular portion; œsophageal appendix and intestinal cœcum absent. Male: spicules sometimes unequal. Female: vulva in front of the middle of the body. Parasites of marine mammals, and birds.

Type species: *A. dussumierii* (van Ben., 1870). ♂ 79 mm., ♀ 70–100 mm. In dolphins.

Syn., *Ascaris dussumierii* van Ben., 1870.

*A. simplex* Duj., 1845, not *Ascaris simplex* Rud., 1809.

Other species:

*A. diomedæ* (v. Linst., 1888). In *Diomedea* sp.

*A. insignis* (Dies., 1851). In *Delphinus amazonicus*.

Syn., *Peritrachelius insignis* Dies., 1851.

? *A. kükenenthalii* (Cobb, 1888). In *Delphinapterus* sp.

*A. patagonica* (v. Linst., 1880). In *Phoca* sp.

*A. physeteris* Baylis, 1923. In *Physeter catodon*.

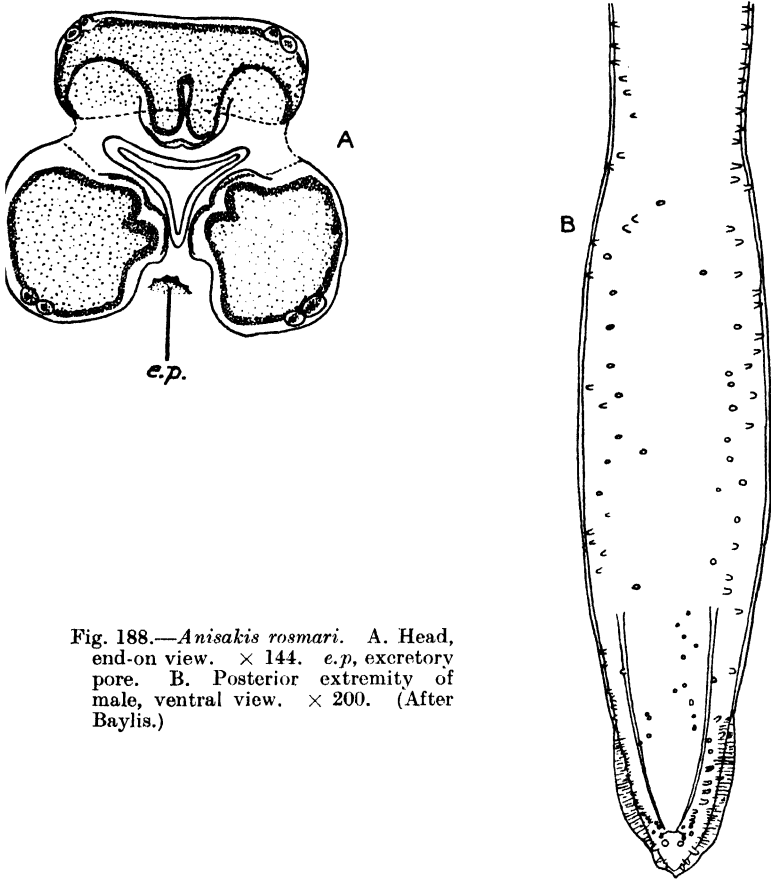


Fig. 188.—*Anisakis rosmari*. A. Head, end-on view.  $\times 144$ . e.p., excretory pore. B. Posterior extremity of male, ventral view.  $\times 200$ . (After Baylis.)

*A. rosmari* (Baylis, 1916). In walruses.

Syn., *Ascaris bicolor* Baird, 1868.

*A. similis* (Baird, 1853). In seals.

*A. simplex* (Rud., 1809). In *Balænoptera* sp., *Delphinus* sp.

*A. typica* (Dies., 1861). In *Delphinus* sp., *Phocæna* sp. and *Prodelphinus* sp.

Syn., *Conocephalus typicus* Dies., 1861.

Refs. 20, 28, 37, 49, 123, 125, 127, 128, 131, 436, 597a.

Genus **PARANISAKIS** Baylis, 1923.

**Definition.**—ANISAKINÆ: small interlabia present; dentigerous ridges absent; the muscular œsophagus is followed by an oval ventriculus; œsophageal appendix and intestinal cæcum absent. Male: spicules subequal and alate; gubernaculum massive. Female: vulva in front of the middle of the body. Oviparous, eggs lenticular, shells thin, contents unsegmented when deposited. Parasites of fishes.

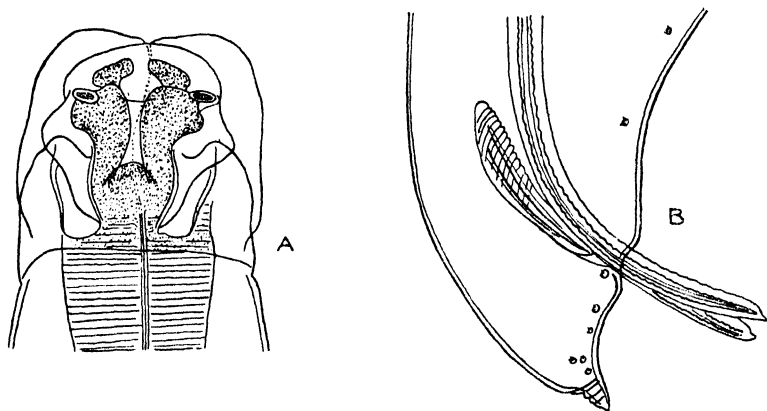


Fig. 189.—*Paranisakis squatinæ*. A. Anterior extremity dorsal view.  $\times 130$ .  
B. Posterior extremity of male, lateral view.  $\times 70$ . (After Baylis.)

Type species: *P. squatinæ* Baylis, 1923. ♂ up to 80 mm., ♀ up to 115 mm. In *Squatina squatina*.  
Ref. 34.

Genus **RAPHIDASCARIS** Railliet and Henry, 1915.

Syn., *Hysterothylacium* Ward and Magath, 1916.

**Definition.**—ANISAKINÆ: interlabia absent; dentigerous ridges absent; lips with cuticular expansions, particularly well-developed on the subventral lips; the dorsal lip has two papillæ and the subventral lips one each; œsophagus with an anterior muscular portion and a small posterior ventriculus, from which springs a posterior appendix; intestinal cæcum absent. Male: tail slightly curved ventrally, tapering to a point; spicules equal and winged; gubernaculum absent. Female: vulva in front of the middle of the body. Oviparous. Parasites of fishes.

Type species: *R. acus* (Bloch, 1779). ♂ 31 mm., ♀ 36.5 mm. In *Esox* sp.

Syn., *Ascaris acus* Bloch, 1779.

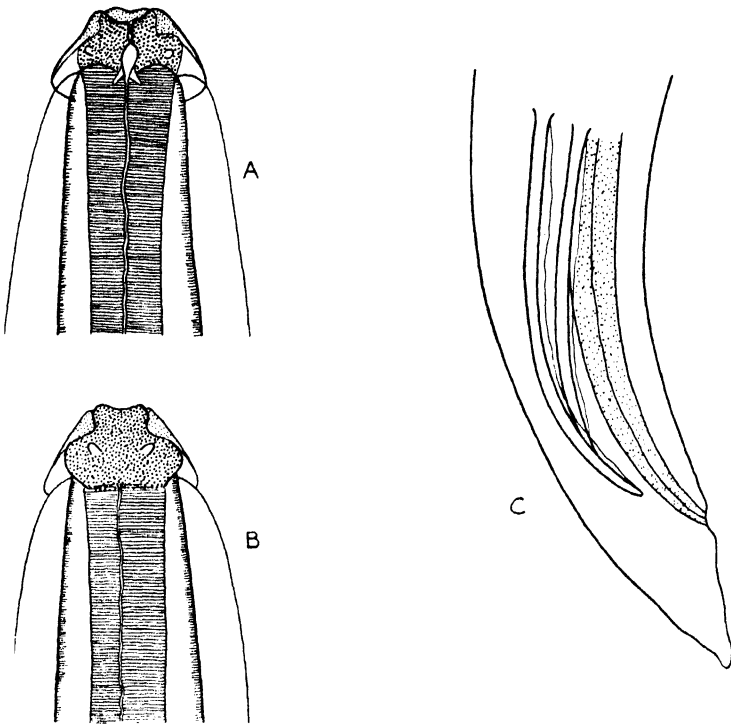


Fig. 190.—*Raphidascaris acus*. A. Anterior extremity, ventral view.  $\times 115$ . B. Anterior extremity, dorsal view.  $\times 115$ . C. Posterior extremity of male, lateral view.  $\times 90$ . (Orig.)

Other species :

*R. brachyurus* (Ward and Magath, 1916). In black bass.

Syn., *Hysterothylacium brachyurum* Ward and Magath, 1916.

*R. cayugensis* Wigdor, 1918. In *Esox americanus*.

Syn., *Hysterothylacium cayugensis* Wigdor, 1918.

Refs. 28, 57, 131, 442, 597a, 662, 666.

Genus DUJARDINIA Gedoelst, 1916.

*Definition*.—ANISAKINÆ: interlabia present with marked grooves running to the bases of the lips; dentigerous ridges absent, but with the cuticle of their internal surfaces produced into large tooth-like structures apparently capable of being interlocked; these structures are carried by three main cuticular lobes on the anterior border of each lip; œsophagus with a small spherical posterior bulb; œsophageal appendix absent; intestinal cæcum present. Male: caudal alæ present in the cloacal region; caudal papillæ few; spicules equal and slender; gubernaculum

usually present with an expanded and solid head, and tapering and hollow posteriorly. Female: vulva in the anterior half of the body opening into a muscular almost sucker-like atrium.

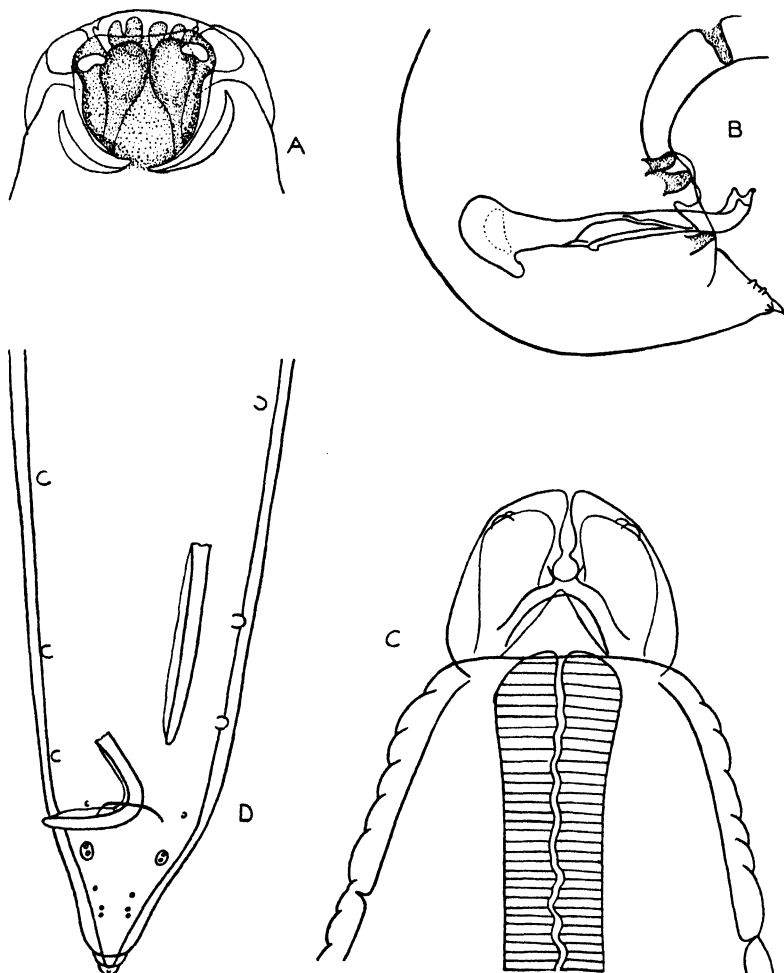


Fig. 191.—*Dujardinia helicina*. A. Head, dorsal view.  $\times 133$ . B. Posterior extremity of male, lateral view.  $\times 133$ . (After Baylis.) *Dujardinia halicoris*. C. Anterior extremity, ventral view.  $\times 56$ . D. Posterior extremity of male, ventral view.  $\times 18$ . (Orig.)

Oviparous, eggs subglobular with thin shells, unsegmented when deposited. Parasites of reptiles, fishes, and marine mammals.

Type species: *D. helicina* (Molin, 1860). ♂ about 18 mm. ♀ 34–40 mm. In *Crocodilus* spp.

Syn., *Ascaris helicina* Molin, 1860, not *Trispiculascaris helicina* (Molin, 1860) of Skrjabin, 1916.

*Dujardinia dujardini* Travassos, 1920.

Other species :

*D. halicoris* (Owen, 1833). In *Halicore dugong*.

*D. malapteruri* Baylis, 1923. In *Malpterurus electricus*.

? *D. nigra* (Gedoelst, 1916). In *Crocodilus niloticus*.

*D. woodlandi* Baylis, 1923. In *Gavialis gangeticus*.

Refs. 28, 36, 42, 128, 151, 359, 597a, 639.

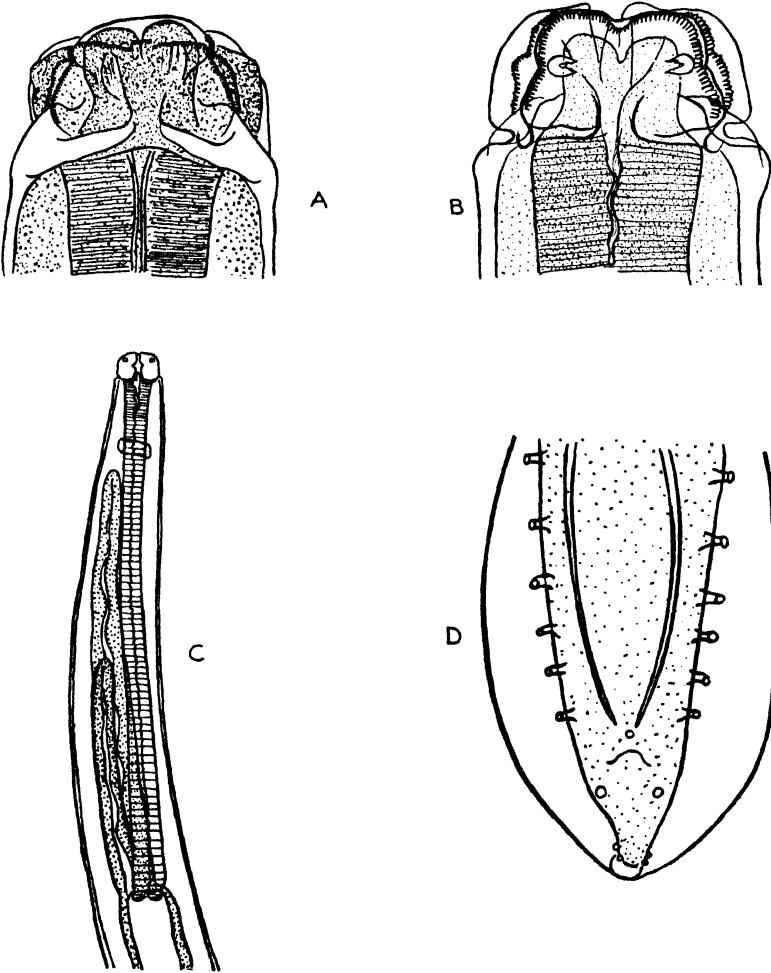


Fig. 192.—*Amplicæcum colurum*. Head, dorsal view.  $\times 70$ . (After Baylis.) *Amplicæcum africanum*. B. Head, dorsal view.  $\times 26$ . C. Anterior extremity, lateral view.  $\times 26$ . D. Posterior extremity of male, ventral view.  $\times 70$ . (After Taylor.)



Genus **AMPLICÆCUM** Baylis, 1920.

*Definition.*—**ANISAKINÆ** : small interlabia present ; dentigerous ridges present ; œsophagus without a ventriculus or posterior bulb ; one (rarely two) intestinal cæcum present ; œsophageal appendix absent. Male : with a few postanal and a number of preanal papillæ ; spicules equal ; gubernaculum absent. Female : vulva in the anterior part of the body. Parasites of birds, amphibia, and reptiles.

Type species : *A. colurum* (Baylis, 1919). ♂ and ♀ 46 mm. In *Lophoaëtus occipitalis*.

Syn., *Ascaris colura* Baylis, 1919.

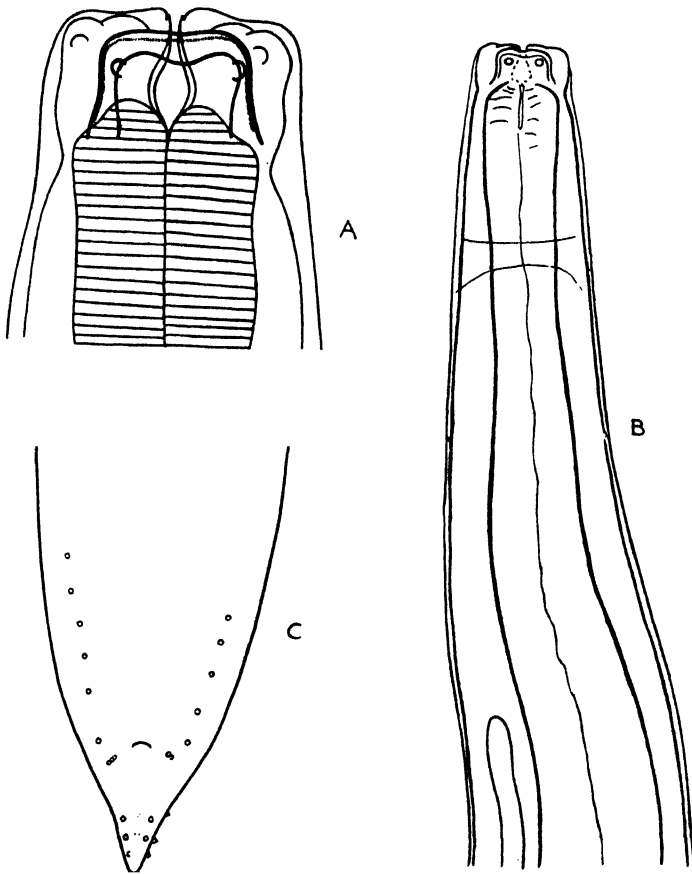


Fig. 193.—*Angusticæcum holopterum*. A. Head, dorsal view.  $\times 84$ . B. Anterior extremity, dorsal view.  $\times 33$ . C. Posterior extremity of male, ventral view.  $\times 35$ . (Orig.)

Other species :

*A. africanum* Taylor, 1924. In *Bufo regularis*.

*A. gedoelsti* nom. nov. In a large toad.

Syn., *Ascaris bufonis* Gedoelst, 1916, not Schrank, 1788, not Gmelin, 1790.

*A. involuta* (Gedoelst, 1916). In *Chamæleon dilepis*.

*A. varani* Baylis and Daubney, 1922. In *Varanus* sp.

Refs. 22, 28, 151, 597a, 610.

Genus **ANGUSTICÆCUM** Baylis, 1920.

*Definition*.—**ANISAKINÆ** : interlabia absent ; dentigerous ridges present ; œsophagus without a ventriculus or posterior bulb ; a long slender cæcum springs from the intestine a little behind its origin ; œsophageal appendix absent. Male : caudal alæ may or may not be present ; six or seven pairs of preanal papillæ and a variable number of postanal papillæ ; spicules equal ; gubernaculum absent. Female : vulva in the anterior part of the body. Parasites of reptiles and amphibia.

Type species : *A. holoptera* (Rud., 1819). ♂ 85–95 mm., ♀ 126 mm. In *Testudo* spp.

Syn., *Ascaris holoptera* Rud., 1819.

Other species :

*A. brevispiculum* Chapin, 1924. In *Testudo denticulata*.

*A. numidicum* (Seurat, 1917). In *Rana* sp.

Syn., *Porrocæcum numidicum* Seurat, 1917.

Refs. 28, 92, 129, 131, 480, 537, 597a.

Genus **PORROCÆCUM** Railliet and Henry, 1912.

Syn., *Terranova* Leiper and Atkinson, 1914.

? *Capsularia* Zeder, 1800 (*Agamonema*).

*Definition*.—**ANISAKINÆ** : interlabia (usually small) present in most cases ; dentigerous ridges present ; œsophagus with an anterior muscular portion and a posterior ventriculus of oblong shape ; the latter is short in the genotype but in the other species frequently long and bent at an angle so as to open into the intestine laterally ; intestinal cæcum present ; œsophageal appendix absent. Male : spicules equal ; gubernaculum usually absent. Female : vulva near the middle of the body. Oviparous. Parasites of birds, marine mammals, and fishes.

Type species : *P. crassum* (Deslongchamps, 1824). ♂ (? Adult) 11.6 mm., ♀ 46–48 mm. In ducks.

Other species :

*P. americanum* Schwartz, 1925. In *Scalopus aquaticus*.

*P. antarcticum* (Leiper and Atkinson, 1914). In *Mustelus antarcticus*.

Syn., *Terranova antarctica* Leiper and Atkinson, 1914.

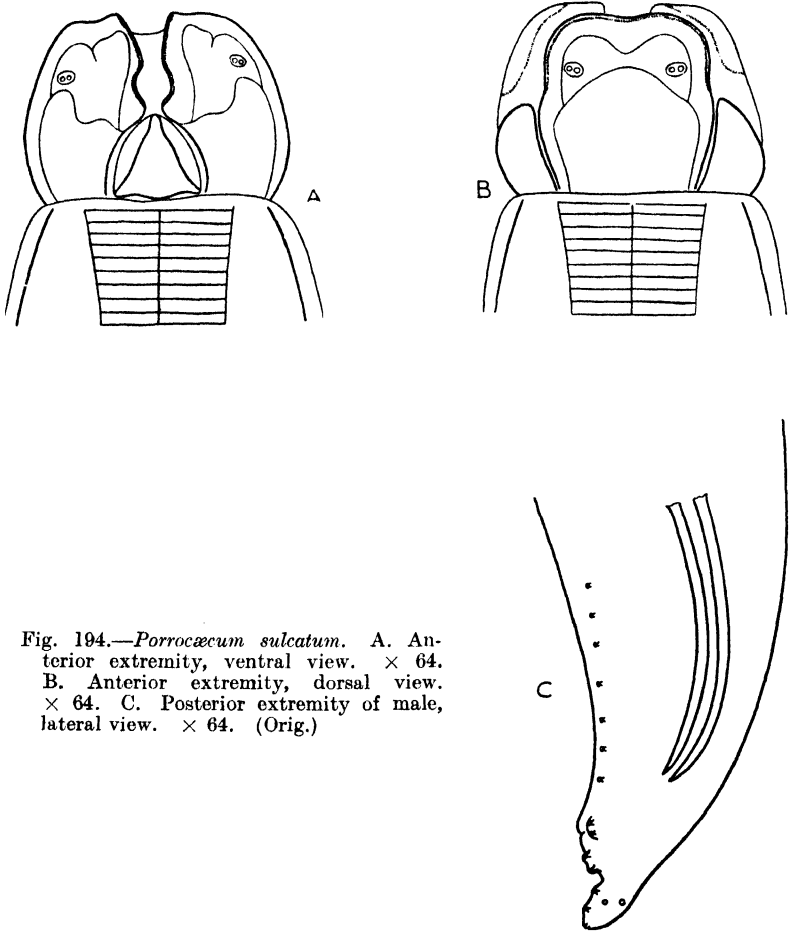


Fig. 194.—*Porrocaecum sulcatum*. A. Anterior extremity, ventral view.  $\times 64$ . B. Anterior extremity, dorsal view.  $\times 64$ . C. Posterior extremity of male, lateral view.  $\times 64$ . (Orig.)

*P. angusticolle* (Molin, 1860). In *Buteo* sp., *Archibuteo* sp., *Circus* sp., *Pernis* sp., *Milvus* sp., etc.

*P. crocodili* Taylor, 1924. In crocodiles.

*P. decipiens* (Krabbe, 1878). In seals. Larval form probably *Ascaris capsularia* Rud., 1802; so *Capsularia salaris* (Gmel., 1790) Zeder, 1880.

- P. depressum* (Zed., 1800). In *Falco* sp., etc.  
*P. encapsulatum* Schwartz, 1925. In *Blarina brevicauda*.  
*P. ensicaudatum* (Zed., 1800). In *Turdus* sp., *Sturnus* sp.  
*P. pristis* Baylis and Daubney, 1922. In *Pristis* sp.  
*P. reticulatum* (Linst., 1899). In *Ardea* sp., *Nycticorax* sp.  
 Syn., *Ascaris ardeæ* Smith, Fox, and White, 1908.  
*P. semiteres* (Zed., 1800). In *Vanellus*, etc.  
*P. serpentulus* (Rud., 1809). In *Ardea* sp., *Grus* sp.  
*P. sulcatum* (Rud., 1819). In *Thalassochelys* sp., *Testudo* sp., etc.

and probably also :

- P. heteroura* (Crepl., 1829). In *Charadrius* sp., etc.  
*P. kirghisensis* (Skrjabin, 1916). In *Aguila imperialis*.  
*P. prælongum* (Duj., 1845). In *Colymbus* sp.  
*P. spirale* (Rud., 1795). In owls.

Refs. 20, 28, 31, 131, 296, 436, 481d, 597a.

Genus **CONTRACÆCUM** Railliet and Henry, 1912.

Syn., *Kathleena* Leiper and Atkinson, 1914.

*Definition*.—ANISAKINÆ : interlabia present, usually very well-developed ; dentigerous ridges absent ; œsophagus with a

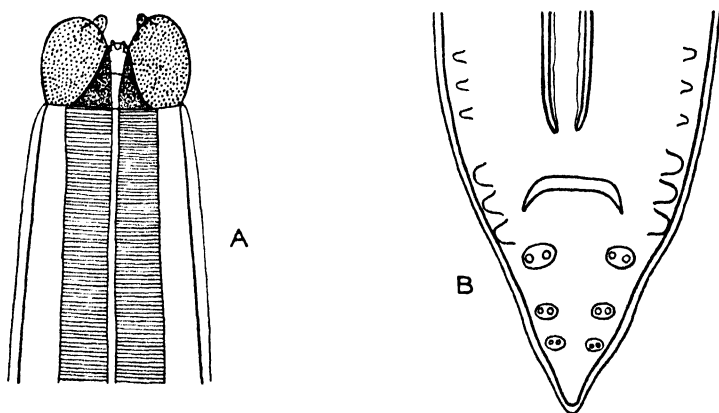


Fig. 195.—*Contracæcum spiculigerum*. A. Anterior extremity, ventral view.  $\times 144$ . B. Posterior extremity of male, semi-diagrammatic. (Orig.)

reduced posterior ventriculus, giving off a solid posterior appendix ; intestinal cæcum present. Male : without definite caudal alæ ; three or four pairs of postanal papillæ which may be doubled, and

numerous preanal papillæ ; spicules equal ; gubernaculum usually absent. Female : vulva in the anterior part of the body. Oviparous. Parasites of fish-eating mammals and birds, and of fishes.

Type species : *C. spiculigerum* (Rud., 1809). ♂ 32–36 mm., ♀ 30–44 mm. In *Pelecanus* spp., *Phalacrocorax* sp.

Syn., *Ascaris spiculigera* Rud., 1809.

Other species :

*C. aduncum* (Rud., 1802). In *Alosa* sp., *Clupea* sp.

*C. andersoni* Vevers, 1923. In *Florida cærulea*.

*C. auctum* (Rud., 1802). In *Blennius* sp., etc.

*C. bidentatum* (Linstow, 1899). In *Acipenser ruthenus*.

*C. clavatum* (Rud., 1809). In various fishes.

*C. cornutum* (Stossich, 1904). In *Thynnus* sp.

*C. engonium* Baylis and Daubney, 1922. In *Ciconia nigra*.

*C. fabri* (Rud., 1819). In *Zeus faber*.

*C. falcigerum* (Railliet and Henry, 1907). In seals.

*C. filiforme* (Stoss., 1904). In *Uranoscopus scaber*.

*C. haliaëti* Baylis and Daubney, 1923. In *Haliaëtus* sp.

Syn., *Ascaris aquillæ* Smith, Fox and White, 1908.

*C. incurvum* (Rud., 1819). In *Xiphias gladius*, *Histiophorus gladius*.

*C. lobulatum* (Schneider, 1866). In *Platanista* sp.

*C. microcephalum* (Rud., 1809). In *Ardea* spp., etc.

Syn., *Kathleena arcuata* Gedoelst, 1916.

*C. micropapillatum* (Stossich, 1890). In *Pelecanus* spp.

*C. multipapillatum* (Drasche, 1882). In *Tantalus* sp.

*C. nasutum* (Schneider, 1866). In *Pelecanus* sp.

*C. osculatum* (Rud., 1802). In seals.

Syn., *Kathleena osculata* (Rud., 1802).

*C. ovale* (Linst., 1907). In *Podiceps* sp.

*C. phoxini* (Linst., 1887). In *Phoxinus lævis*.

*C. punctatum* (Gedoelst, 1916). In *Pseudotantalus ibis*.

*C. quadricuspe* Walton, 1923. In *Buforides* sp.

*C. radiatum* (Linst., 1906). In seals.

*C. rectangulum* (Linstow, 1906). In seals.

*C. rigidum* (Rud., 1809). In *Lophius* sp.

*C. rodhaini* (Gedoelst, 1916). In *Plotus rufus*.

*C. rosarium* (Connal, 1912). In *Nycticorax griseus*.

*C. schizothoracis* Baylis and Daubney, 1922. In *Schizothorax* sp.

*C. scotti* (Leiper and Atkinson, 1914). In *Diomedea* sp.

*C. stenocephalum* (Railliet and Henry, 1907). In *Stenorhynchus leptonyx* and *Leptonychotes* sp.

*C. tricuspe* (Geddoelst, 1916). In heron, Indian darter.

*C. turkestanicum* Skrjabin, 1923. In *Mergus merganser*.

Refs. 28, 34, 42, 151, 296, 328a, 436, 581, 583, 597a, 657, 659.

Genus **CLÆOASCARIS** Baylis, 1923.

*Definition*.—**ANISAKINÆ**: each lip is provided with a pair of large conical teeth on its inner surface; interlabia absent: a collar-like fold of cuticle surrounds the neck, and between this and the bases of the lips is an area covered with small spines; cesophagus with a small rounded ventriculus and also an oesophageal appendix; intestinal cæcum present; cervical papillæ prominent. Male: spicules short, slender, and equal. Female: vulva in the anterior half of the body. Oviparous, eggs oval, shells thin and granulated and containing an unsegmented ovum

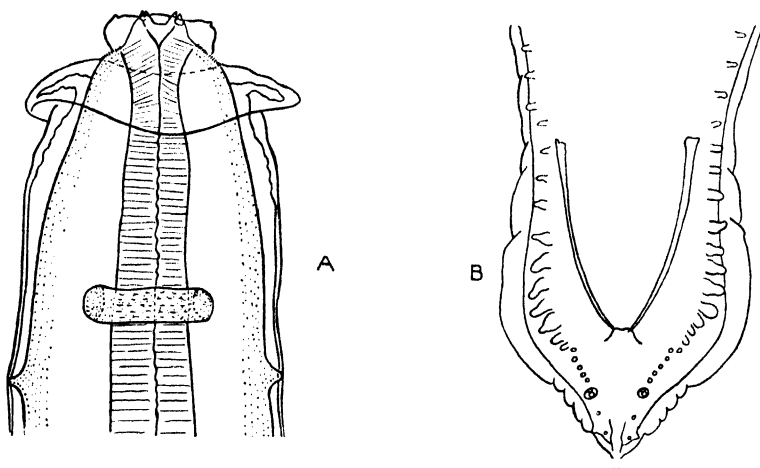


Fig. 196.—*Clæoascaris spinicollis*. A. Anterior extremity, dorsal view.  $\times 70$ . B. Posterior extremity of male, ventral view.  $\times 70$ . (After Baylis.)

at deposition. Parasites of semiaquatic carnivorous land mammals.

Type species: *C. spinicollis* Baylis, 1923. ♂ 40 mm., ♀ 39 mm. In *Lutra* sp. and *Atilax* sp.

Ref. 38.

Genus **MULTICÆCUM** Baylis, 1923.

*Definition*.—**ANISAKINÆ**: small interlabia present with well-marked grooves running to the bases of the lips; dentigerous ridges present; cesophagus with a small posterior ventriculus

from which arise two anterior and three posterior appendices ; intestinal cæcum present. Male : caudal alæ absent ; caudal papillæ few ; spicules equal ; gubernaculum present. Female : vulva near the middle of the body ; vagina directed posteriorly.

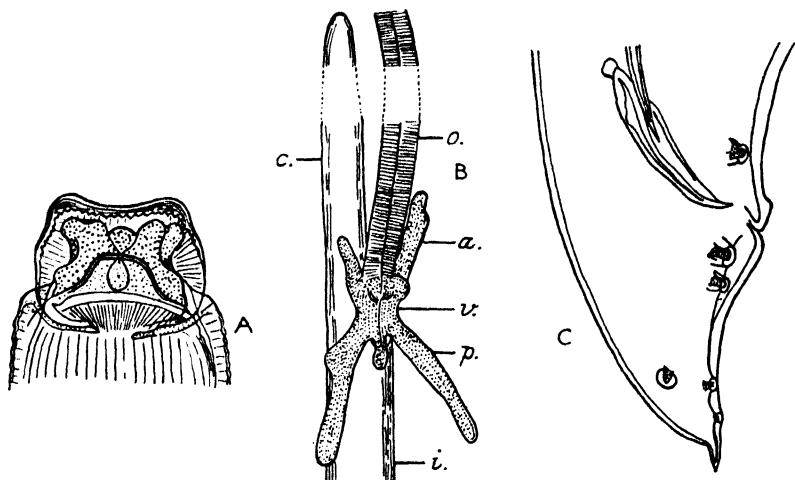


Fig. 197.—*Multicæcum agile*. A. Head, dorsal view. (After Wedl.) B. Intestinal and œsophageal diverticula. *c*, intestinal cæcum ; *i*, intestine ; *o*, œsophagus ; *v*, ventriculus ; *a*, anterior appendix ; *p*, posterior appendix.  $\times 36$ . C. Posterior extremity of male, lateral view.  $\times 150$ . (After Baylis.)

Oviparous, eggs oval with a thin shell, contents segmented when deposited. Parasites of crocodiles.

Type species : *M. agile* (Wedl, 1862). ♂ 34.6 mm., ♀ 31.6 mm. In *Crocodilus niloticus*.

Syn., *Ascaris agilis* Wedl, 1862.

Refs. 36, 664.

#### Subfamily GÆZIINÆ (Travassos, 1919) Baylis, 1920.

Syn., *Gæzinæ* Travassos, 1919.

*Definition*.—**HETEROCHEILIDÆ** : cuticle furnished with a series of circlets of spines.

**Genus GÆZIA** Zeder, 1800.

Syn., *Cochlus* Zeder, 1803.

*Prionoderma* Rud., 1809, not Cuvier, 1817.

*Lecanocephalus* Dies., 1839.

*Definition*.—**GÆZIINÆ** : cuticle presenting a series of rings provided posteriorly with spines directed backwards ; caudal

extremity in each sex rounded and prolonged into an appendix more or less unarmed; anterior extremity domed and separated from the rest of the body by a constriction; œsophagus pestle-shaped and provided with a long glandular appendix directed posteriorly; intestine generally bent at its origin, where it gives off a short cæcum directed anteriorly. Male: spicules subequal. Female: vulva a little in front of the middle of

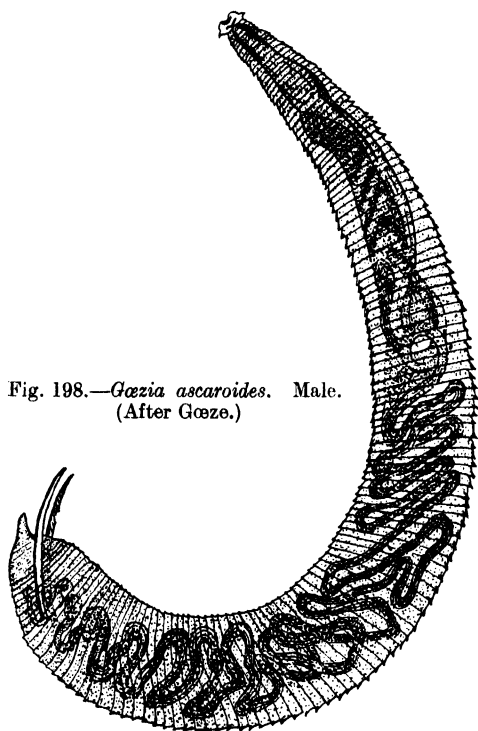


Fig. 198.—*Gæzia ascaroides*. Male.  
(After Gœze.)

the body. Oviparous, eggs small and globular. Parasites of fishes.

Type species: *Gæzia ascaroides* (Gœze, 1782). ♂ and ♀ 25 mm. In *Silurus glanis*.

Syn., *Cucullanus ascaroides* Gœze, 1782.

*Cochlus armatus* Zeder, 1803.

*Prionoderma ascaroides* (Gœze, 1782) Rud., 1809.

Other species:

*G. annulata* (Molin, 1860). In *Labrax lupus*.

*G. kollari* (Molin, 1858). In *Chrysophrys aurata*.



*G. spinulosa* (Dies., 1839). In *Sudis gigas*.

Syn., *Lecanocephalus spinulosus* Dies., 1839.

Refs. 28, 122, 128, 186, 442, 476, 636, 681, 682.

Subfamily CROSSOPHORINÆ Baylis, 1920.

*Definition*.—**HETEROCHEILIDÆ**: behind the lips is a collar consisting of a double row of fimbriæ.

Genus **CROSSOPHORUS** Hemprich and Ehrenberg, 1828.

*Definition*.—**CROSSOPHORINÆ**: lips semicircular in outline, each provided with two papillæ and furnished near the outer edges of

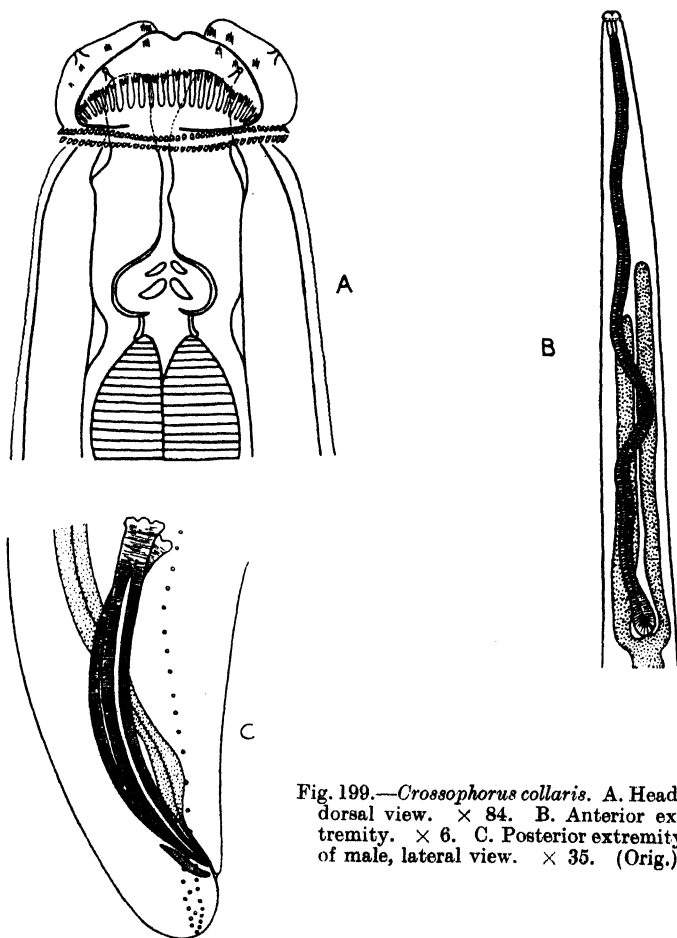


Fig. 199.—*Crossophorus collaris*. A. Head, dorsal view.  $\times 84$ . B. Anterior extremity.  $\times 6$ . C. Posterior extremity of male, lateral view.  $\times 35$ . (Orig.)

its inner aspect with seven or eight groups of "combs" of pointed teeth forming an interrupted dentigerous ridge; behind the three lips is a constriction occupied by a collar consisting of a double row of fimbriæ, these form in reality a single endless chain which doubles on itself at the base of each lip externally and passes round the base of the lip on its inner surface; œsophagus very long and slender, enlarged posteriorly, the anterior portion contains an elaborate chitinous apparatus; two intestinal cæca directed forwards from the commencement of the gut. Male: tail blunt; caudal papillæ arranged in two parallel rows on each side, each row consisting of nine postanal papillæ, whilst in front of the anus the inner row consists of about forty papillæ and the outer of only five; spicules equal and alate; gubernaculum present. Female: tail conical; vulva in the middle third of the body; uteri opposed. Oviparous, eggs oval with a moderately thick smooth shell. Parasites of Hydracoidea.

Type species: *Crossophorus collaris* Hemprich and Ehrenberg, 1828. ♂ 50–65 mm., ♀ 55–90 mm. In *Hyrax*.

Syn., *Ascaris ferox* Hemprich and Ehrenberg, 1828.

Other species: ? *Crossophorus tentaculatus* Hemprich and Ehrenberg, 1828. In *Hyrax*.

Refs. 24, 28, 213, 370.

### ASCAROIDEA insufficiently known.

Genus *ACANTHOCHEILUS* Molin, 1858.

*Definition*.—*ANISAKINÆ*?: insufficiently described; mouth with three lips, each having two pairs of small pointed teeth on



Fig. 200.—*Acanthocheilus quadridentatus*. A. Anterior extremity, dorsal view.  
B. Anterior extremity, end-on view. (After Molin.)

its inner surface and a single papilla externally. Female: vulva in the anterior part of the body. Found in marine fishes. Linton

(1900) described a worm from the stomach of the tiger shark which he named *Acanthocheilus nidifex*: this worm had an intestinal cæcum running forwards beside the œsophagus.

Type species: *A. quadridentatus* Molin, 1858. ♂ 23 mm., ♀ 8 (80 ?) mm. In *Mustelus plebejus*.

Other species:

*A. bicuspis* (Wedl, 1855). In *Scillium* sp., *Pristiurus* sp.

*A. intermedius* Oerley, 1885. In *Mustelus lævis*.

*A. nidifex* Linton, 1900. In *Galeocerdo tigrinus*.

Refs. 125, 333, 355.

#### Genus **HELIGMUS** Dujardin, 1845.

*Definition*.—**ANISAKINÆ**?: body slightly attenuated towards the extremities, head rounded with three small lips each bearing a papilla; œsophagus muscular and enlarged posteriorly, followed by a distinct ventriculous or ? bulb. Male: tail curved spirally, terminating sharply in a conical point; anus on a prominent tubercle; a double row of twelve or thirteen adanal papillæ; spicule single, capable of being rolled into a loose helix in the interior, and consisting of a transversely striated tube formed of a transparent membrane. Female: vulva about the anterior third of the body. Parasites of fishes.

Type species: *H. longicirrus* Dujardin, 1845. ♂ 17 mm., ♀ 25.5 mm. In a fish, *Pleuronectes platessa*, from Rennes.

Ref. 131, 597a.

#### Superfamily **SPIRUROIDEA** Railliet & Henry, 1915.

*Definition*.—**EUNEMATODA**: usually more or less filiform worms; mouth usually with two lips, but there may be four or six small lips, or rarely the lips may be inconspicuous or absent. Behind the buccal cavity, which is bounded by the lips, there is frequently a chitinous vestibule; rarely the buccal cavity is large and chitinous; œsophagus usually long, cylindrical, and divided into two parts, a shorter anterior muscular portion and a longer glandular posterior portion, rarely it is undivided and sometimes enlarged anteriorly or posteriorly; intestine usually simple without diverticula. Male: spicules usually very unequal and dissimilar. Female: vulva usually near the middle of the body, sometimes posteriorly, and rarely in the œsophageal region. Parasites of the alimentary canal, respiratory system, or orbital, nasal or oral cavities of vertebrates.

## KEY TO FAMILIES.

1. Sexual dimorphism marked, the female being greatly distended towards the middle of its length and fusiform in shape . . . Tetrameridæ, p. 361.  
Sexual dimorphism not marked . . . 2
2. Head provided with more or less prominent appendages of diverse appearance . . . Ancyracanthidæ, p. 364.  
Head without appendages . . . 3
3. With four highly specialized lips ; males always rolled about females, the posterior end of which is invaginated forming a sucker-like groove from which projects a chitinous hook . . . Hedruridæ, p. 374.  
Without four highly specialized lips, etc. . . . . 4
4. With a large chitinous buccal capsule . . . . . Camallanidæ, p. 376.  
Without a large chitinous buccal capsule . . . . . 5
5. Head consisting of two large lateral lobes ; œsophagus muscular throughout, dilated anteriorly to form a pseudo-buccal capsule, and enlarged posteriorly . . . Cucullanidæ, p. 380.  
Head and œsophagus not exhibiting the above characters . . . 6
6. Anterior end of body with cuticular cordons . . . . . Acuariidæ, p. 326.  
Anterior end of body without cuticular cordons . . . . . 7
7. Mouth with two large lateral trilobed lips, each having the cuticle of its inner surface thickened and raised into longitudinal tooth-like ridges meeting or interlocking with those of the opposite lip ; with a cuticular head bulb . . . . . Gnathostomidæ, p. 338.

- Lips usually without the above characters ; without a cuticular head bulb . . . . . 8
8. Cuticle armed with chitinous hook-like spines arranged in longitudinal rows or in circles along the whole, or the anterior portion, of the body . . . . . Rictulariidae, p. 343.
- Cuticle not armed with chitinous hook-like spines . . . . . 9
9. Cuticle with numerous longitudinal dark bands ; œsophagus short, entirely muscular, and somewhat enlarged posteriorly . . . . . Seuratidae, p. 349.
- Cuticle without longitudinal dark bands ; œsophagus without the above characters . . . . . 10
10. Mouth with large simple triangular lateral lips armed with one or more teeth ; usually with a large cephalic collarette ; usually without a vestibule. Males with large caudal alæ supported by long costiform papillæ . . . . . Physalopteridae, p. 351
- Lips, if present, without the above characters ; cephalic collarette absent ; vestibule almost always present. Males with or without caudal alæ . . . . . 11
11. Males with broad caudal alæ, and usually with four pairs (rarely more) of large preanal papillæ which are almost invariably pedunculated . . . . . Spiruridae, p. 290.
- Males with or without caudal alæ, preanal papillæ sessile, usually numerous, and arranged in a linear row . . . . . Thelaziidae, p. 316.
12. SPIRUROIDEA insufficiently known, p. 385.

#### FAMILY SPIRURIDÆ OERLEY, 1885.

*Definition.*—SPIRUROIDEA : mouth usually with trilobed lateral lips, occasionally small dorsal and ventral lips may also be present,

or definite lips absent. Behind the mouth cavity bounded by the lips there is usually a more or less cylindrical, chitinated vestibule; œsophagus long and cylindrical, and divided into a short anterior muscular portion, and a longer glandular part; cervical papillæ, usually at least one, in front of the nerve ring; lateral flanges present or absent. Male: caudal alæ well-developed and supported by pedunculated papillæ, of which there are almost always four preanal pairs. Female: vulva usually near the middle of the body; oviparous. Parasites of œsophagus, stomach, and intestine of vertebrates.

## KEY TO SUBFAMILIES.

1. Cephalic and œsophageal regions  
ornamented with cuticular  
plaques . . . . . Gongyloneminae, p. 312.
- Cephalic and œsophageal regions  
not ornamented with cuticular  
plaques . . . . . 2
2. Vestibule with ring-like or spiral  
thickenings . . . . . Arduenninae, p. 306.
- Vestibule without ring-like or spiral  
thickenings . . . . . 3
3. Lips large and distinctly trilobed  
with cuticle of inner surface  
thickened and tending to inter-  
lock with that of opposite lip . Spiroxyinae, p. 302.
- Lips indefinite or, if present, with-  
out the above characters . . . Spirurinae, p. 291.

## Subfamily SPIRURINÆ Railliet, 1915.

*Definition.*—SPIRURIDÆ: mouth with or without definite lips vestibule without ring-like or spiral thickenings; cephalic and œsophageal regions not ornamented with cuticular tubercles.

## KEY TO GENERA.

1. Cuticle with a ventral prominence or  
boss in anterior region of body . Spirura, p. 292.
- Cuticle without a ventral boss . . . 2
2. Vestibule infundibular with six radially  
arranged triangular chitinous plates Cylicospirura, p. 294
- Vestibule without six radially arranged  
triangular chitinous plates . . . 3

3. Mouth hexagonal, without definite lips;  
pulp of cephalic papillæ very large,  
prominent, and sending a branch  
inwards to small subsidiary papillæ  
situated just within the mouth  
aperture . . . . . Spirocerca, p. 295.  
Mouth with definite lips; cephalic  
papillæ without the above characters 4
4. Lateral lips each bear externally two  
small triangular membranous alæ . . . . . Hadjelia, p. 301.  
Lateral lips without membranous alæ . . . . . 5
5. Dorsal and ventral lips deeply notched;  
vestibule with very delicate walls;  
uteri parallel . . . . . Cyrnea, p. 299.  
Dorsal and ventral lips not deeply  
notched; vestibule with heavily-  
chitinized walls; uteri divergent . . . . . 6
6. Left spicule longer than right, with one  
or two pairs of pedunculated postanal  
papillæ; eggs without polar fila-  
ments; parasites of mammals and  
birds . . . . . Habronema, p. 296.  
Right spicule longer than left; with  
four pairs of pedunculated postanal  
papillæ; eggs with polar filaments;  
parasites of fishes . . . . . Metabronema, p. 299.

Genus **SPIRURA** Blanchard, 1849.

Syn., *Spiroptera* Rud., 1819, in part.

*Definition*.—**SPIRURINÆ**: posterior part of body decidedly thicker than the anterior, more or less spirally twisted; cuticle with fine transverse striations and with a prominent ventral hump or boss about 2 mm. from the anterior extremity, lateral flanges absent; mouth elongated dorso-ventrally, surrounded by the chitinous prolongation of the vestibule, which is everted and thickened dorsally and ventrally; just outside this are two small trilobed lateral lips each having a lateral and two submedian head papillæ, but without teeth on their inner surface; vestibule well-marked, wide, and cylindrical when seen laterally, but much narrower and funnel-shaped when viewed dorsally or ventrally; œsophagus very long, cylindrical, and indistinctly divided into two parts, a very short anterior and a long slightly wider posterior

portion. Excretory pore just behind the first portion of the oesophagus. Male : posterior extremity conical with large caudal alæ, uniting behind the tip of the tail, supported by four pairs of pedunculated preanal papillæ, a single unpaired papilla immediately in front of the cloaca and two or three pairs of pedunculated postanal papillæ—one pair immediately behind the cloaca and the others some distance posteriorly—and in addition there are

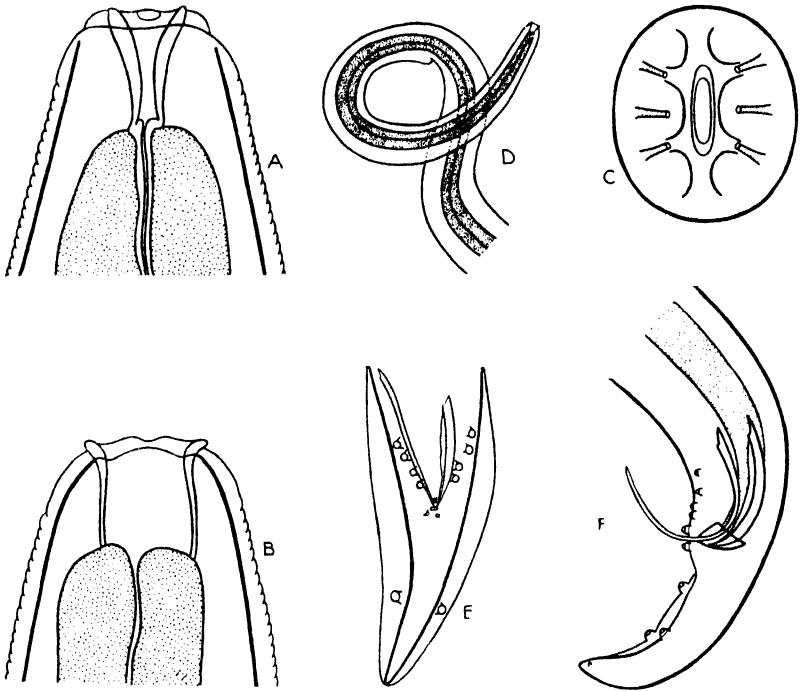


Fig. 201.—*Spirura talpæ*. A. Head, ventral view.  $\times 300$ . B. Head, lateral view.  $\times 300$ . C. Head, end-on view.  $\times 300$ . D. Anterior extremity, lateral view showing ventral boss.  $\times 32$ . E. Posterior extremity of male, ventral view.  $\times 64$ . F. Posterior extremity of male, lateral view.  $\times 64$ . (Orig.)

one or two pairs of small papillæ near the tip of the tail ; spicules unequal and dissimilar, the right being longer and narrower, and the left broader and winged ; gubernaculum present. Female : posterior extremity conical and rounded ; vulva behind the middle of the body about three-fifths of the length of the worm from the anterior extremity. Oviparous, eggs with a thick shell containing an embryo when deposited. Parasites of insectivora and carnivora.



Type species: *S. talpæ* (Gmelin, 1790). ♂ 10–20 mm., ♀ 20–32 mm. In *Talpa europæa*.

Syn., *Ascaris talpæ* Gmelin, 1790.

*Ascaris strumosa* Froelich, 1791.

*Fusaria convoluta* Zeder, 1803.

*Spiroptera strumosa* (Froelich, 1791) Rud., 1819.

*Filaria strumosa* (Froelich, 1791) Schneider, 1866.

Other species:

*S. rothschildi* Seurat, 1915. In *Elephantulus deserti*.

Syn., *S. gastrophila* Seurat, 1913, not Mueller, 1894.

*S. rytipleurites* (Deslongchamps, 1824). In cat, fox, and hedgehog.

Syn., *Filaria rytipleurites* Deslongchamps, 1824.

*Filaria gastrophila* Mueller, 1894.

Refs. 55, 205, 483, 485, 489, 511, 524, 535.

Genus **CYLICOSPIRURA** Vevers, 1922.

*Definition*.—SPIURINÆ: mouth circular without definite lips, with six small head papillæ; vestibule deep, infundibular, and

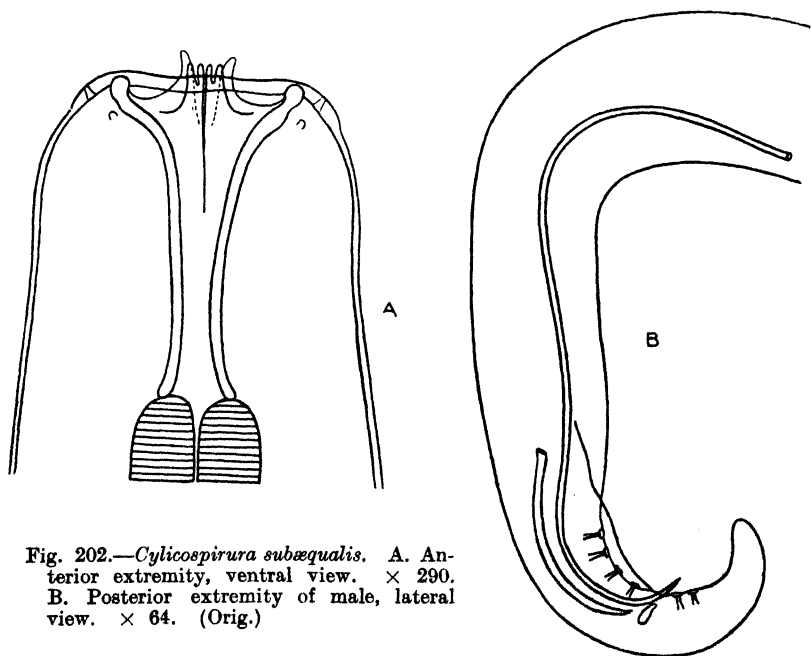


Fig. 202.—*Cylicospirura subæqualis*. A. Anterior extremity, ventral view.  $\times 290$ . B. Posterior extremity of male, lateral view.  $\times 64$ . (Orig.)

provided with six triangular chitinous plates arranged radially, the internal free end of each of which terminates in a bicuspid

tooth, which projects slightly beyond the entrance to the mouth capsule; œsophagus very long and divided into two portions, the anterior being much shorter than the posterior. Male: posterior extremity twisted spirally; narrow symmetrical caudal alæ; four pairs of preanal and two of postanal papillæ; spicules very unequal; gubernaculum present. Female: vulva in the anterior half of the body. Ovoviviparous. Parasites of carnivora.

Type species: *C. subæqualis* (Molin, 1860). ♂ 22.5 mm., ♀ 19–21 mm. In *Felis* spp.

Syn., *Spiroptera subæqualis* Molin, 1860.

Refs. 128, 358, 490, 656.

Genus **SPIROCERCA** Railliet and Henry, 1911.

*Definition*.—SPIRURINÆ: without definite lips, mouth hexagonal with long axis dorso-ventral, leading into a vestibule with

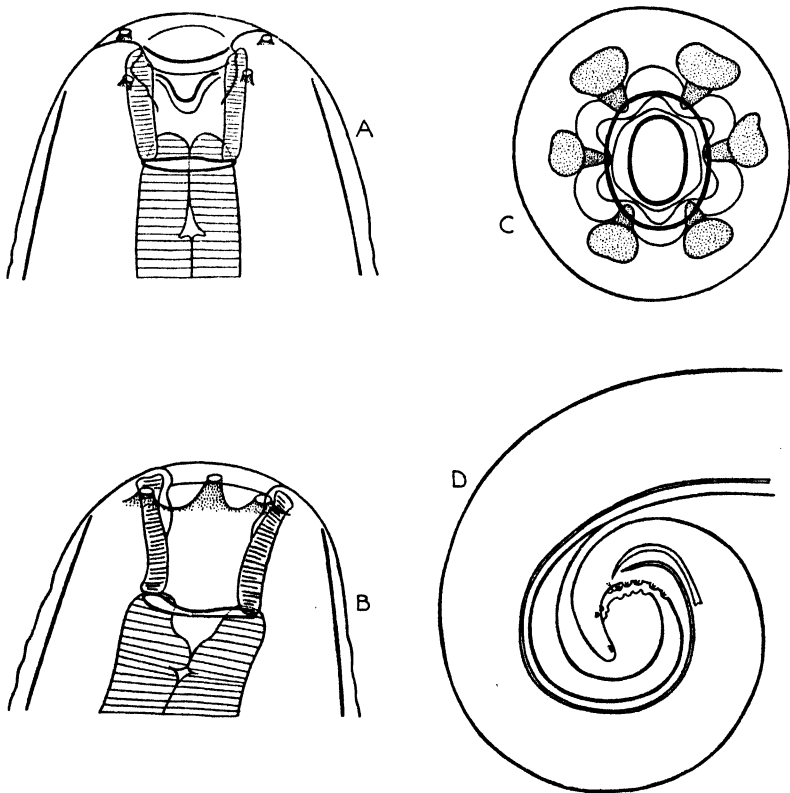


Fig. 203.—*Spirocerca sanguinolenta*. A. Head, ventral view.  $\times 140$ . B. Head, lateral view.  $\times 140$ . C. Head, end-on view.  $\times 140$ . D. Posterior extremity of male, lateral view.  $\times 24$ . (Orig.)

cuticular walls of considerable thickness, which is expanded anteriorly with its edges folded inwards and is narrower posteriorly. The border of the mouth is surrounded by six masses of dense parenchyma, which are the pulps of the cephalic papillæ, each pulp mass sends a branch inwards to a small subsidiary papilla situated in the wall of the vestibule just within the mouth aperture—these are “the teeth” described by Railliet and Henry (1911); œsophagus divided into two portions, a shorter narrow muscular anterior portion and a longer wide glandular posterior portion; cervical papillæ at the level of the nerve ring. Male: tail spiral; caudal alæ present; four pairs of pedunculated preanal papillæ and a single large median papilla on the anterior lip of the cloacal aperture, two pairs of postanal pedunculated papillæ and a group of five pairs of minute papillæ near the tip of the tail; spicules very unequal; a rudimentary accessory piece is present. Female: tail blunt, with a pair of almost terminal papillæ; vulva anterior, near the posterior end of the œsophagus; uteri parallel. Oviparous, eggs cylindrical with thick shells, containing embryos when deposited. Parasites in tumours of the œsophagus, stomach, aorta, and lungs of carnivora.

Type species: *S. sanguinolenta* (Rud., 1819). ♂ 40–50 mm., ♀ 70–80 mm. In dog, jackal, and fox.

Syn., *Spiroptera sanguinolenta* Rud., 1819.

Refs. 33, 432, 477, 490, 496, 552.

Genus **HABRONEMA** Dies., 1861.

Syn., *Dermofilaria* Rivolta, 1884.

*Definition*.—SPIRURINÆ: mouth with two lateral lips usually trilobed and without teeth, sometimes dorsal and ventral lips in addition; cuticular flange may be present on one or both sides of the body; cervical papillæ in front of the nerve ring; vestibule well-developed, strongly chitinized and cylindrical or funnel-shaped; œsophagus consists of two parts, the anterior part being the shorter. Male: tail spirally coiled; large caudal alæ present; four pairs of pedunculated preanal papillæ and one or two pairs of postanal papillæ, with two or three pairs of small papillæ near the tip of the tail; spicules very unequal, the left being the longer; gubernaculum present. Female: posterior extremity conical; vulva near the middle of the body; uteri divergent. Oviparous, eggs oval, with thin or thick shells, containing embryos at deposition. Parasites of the stomach of mammals and birds.

Type species: *H. muscæ* (Carter, 1861). ♂ 8–14 mm.,  
♀ 13–22 mm. In equines.

Syn., *Filaria muscæ* Carter, 1861.

Other species:

*H. chevreauxi* Seurat, 1913. In *Felis ocreata*.

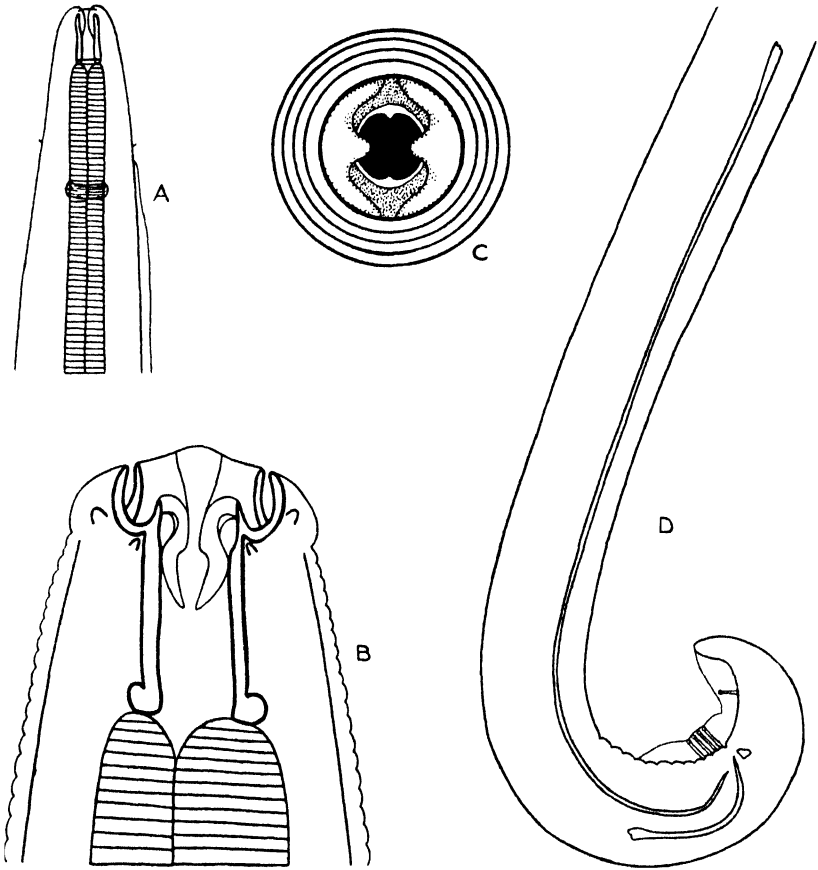


Fig. 204.—*Habronema muscæ*. A. Anterior extremity, ventral view.  $\times 90$ .  
B. Head, lateral view.  $\times 400$ . C. Head, end-on view.  $\times 480$ . D.  
Posterior extremity of male, lateral view.  $\times 56$ . (Orig.)

*H. colaptes* Walton, 1923. In *Colaptes* sp.

*H. fischeuri* Seurat, 1916. In *Bubulcus lucidus*.

*H. grimaldiæ* Seurat, 1915. In *Vulpes atlantica*.

*H. incertum* (Smith, 1908). In parakeets.

*H. leptopterum* (Rud., 1819). In *Falco buteo*, *Accipiter nisus*.

*H. mansioni* Seurat, 1914. In *Buteo vulgaris*.

*H. megastoma* (Rud., 1819). In equines.

Syn., *Spiroptera megastoma* Rud., 1819.

*Dermofilaria irritans* Rivolta, 1884.

*H. microstoma* (Schneider, 1866). In equines.

*H. monoapterum* Gendre, 1923. In nocturnal birds of prey.

*H. nouveli* Seurat, 1915. In *Genetta* sp.

*H. seurati* Skrjabin, 1917. In *Falco* sp.

*H. spinosum* Gendre, 1923. In *Falco tinnunculus*.

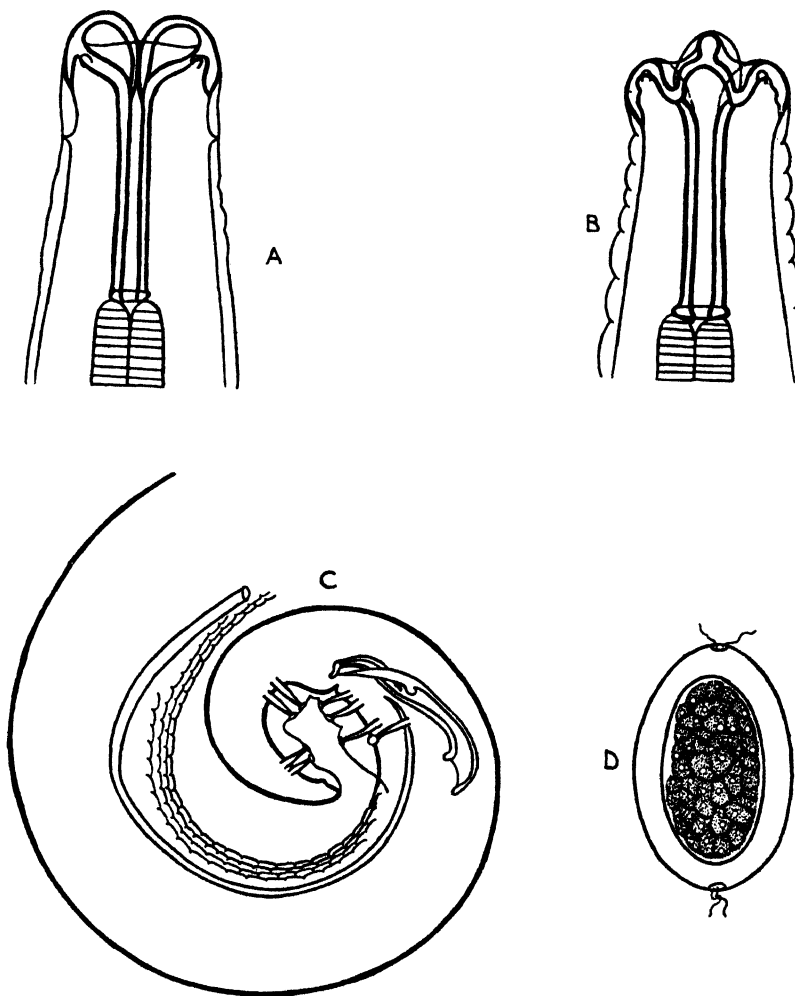


Fig. 205.—*Metabronema magnum*. A. Head, ventral view.  $\times 115$ .  
B. Head, lateral view.  $\times 115$ . C. Tail of male, lateral view.  $\times 56$ .  
D. Egg.  $\times 900$ . (Orig.)

\**H. tulostoma* (Hemp. and Ehrenb., in Schneider, 1866). In vultures.

*H. unilaterale* (Molin, 1860) Seurat, 1914. In *Neophron percnopterus*.

*H. zebrae* Theiler, 1923. In zebra.

Refs. 125, 181, 443a, 459, 467, 472a, 490, 497, 499, 511, 524, 555, 578, 583, 615, 659.

Genus **METABRONEMA** n. g.

*Definition.*—SPIRURINÆ: mouth with large lateral lips, and small median lips continuous with the lateral by means of a cuticular fold; the whole head structure is strengthened with a chitinous support which is continuous with the chitinous wall of the vestibule; cuticular flanges present on both sides of the body; cervical papillæ situated far forwards slightly behind the lips; vestibule thick-walled and cylindrical; œsophagus consists of two parts. Male: tail spirally coiled; caudal alæ well-developed; four pairs of pedunculated preanal papillæ and four pairs of pedunculated postanal papillæ, and a pair of large sessile papillæ near the tip of the tail; spicules very unequal, the right being the larger; gubernaculum present. Female: tail conical; vulva near the junction of the anterior and middle thirds of the body; uteridivergent. Oviparous, eggs thick-shelled with a small button-shaped structure at either end from each of which arise two very delicate filaments, they contain a morula when deposited. Parasites of fishes.

Type species: *M. magnum* (Taylor, 1925). ♂ 23–25 mm., ♀ 19–94 mm. In *Trochurus declivis*, and *Sparus* sp.

Syn., *Habronema magna* Taylor, 1925.

Ref. 611.

Genus **CYRNEA** Seurat, 1914.

*Definition.*—SPIRURINÆ: mouth with two well-developed lateral lips, exhibiting dentiform thickenings internally, and dorsal and ventral lips with the free border deeply notched, each having a pair of submedian papillæ; lateral flanges absent; cervical papillæ far forward, anterior to œsophagus; vestibule cylindrical and not strongly chitinized; œsophagus long, divided into two parts, the anterior being the shorter. Male: tail not inrolled; well-developed, transversely striated caudal alæ; with nine pairs of long pedunculated papillæ, of which three are preanal, and in addition a pair of very small preanal papillæ; spicules very

\* Possibly this species is synonymous with *H. unilaterale*.

unequal; gubernaculum present. Female: tail conical, digitiform; vulva near the middle of the body, or a little in front of the anus; uteri parallel. Oviparous, eggs with thick shells and containing embryos. Parasites of birds.

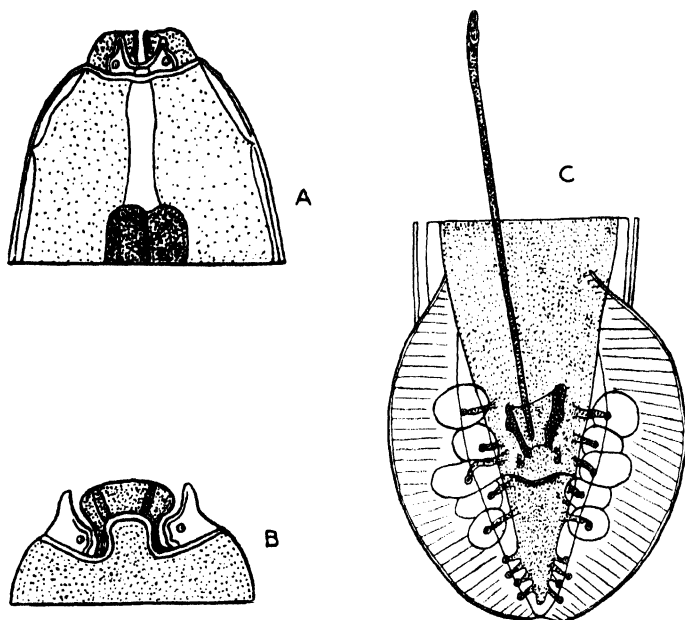


Fig. 206.—*Cyrnea eurycerca*. A. Anterior extremity, ventral view.  $\times 230$ . B. Anterior extremity, lateral view.  $\times 230$ . C. Posterior extremity of male, ventral view.  $\times 150$ . (After Seurat.)

Type species: *C. eurycerca* Seurat, 1914. ♂ 7.6 mm., ♀? In partridges.

Other species:

*C. bulbosa* (Linstow, 1906). In *Pavo* spp.

*C. excisa* (Molin, 1860). In *Ciconia* spp.

Syn., *Spiroptera excisa* Molin, 1860.

*Physaloptera striata* Linstow, 1883.

*C. ovata* (Linstow, 1907). In *Astur melanoleucus*.

Syn., *Physaloptera ovata* Linstow, 1907.

*C. parroti* Seurat, 1917. In rock partridge.

*C. semilunaris* (Molin, 1860). In *Crotophaga major*.

Syn., *Spiroptera semilunaris* Molin, 1860.

*Spiroptera lanceolata* Molin, 1860.

Refs. 128, 358, 378, 497, 499, 504, 543.

Genus **HADJELIA** Seurat, 1916.

Syn., *Gilsonia* Gedoelst, 1919.

*Definition.*—**SPIRURINÆ**: mouth with two large lateral trilobed lips, without teeth on their inner surface, but with two small triangular wings or crests set obliquely on the external surface of each, and with small deeply-notched dorsal and ventral lips;

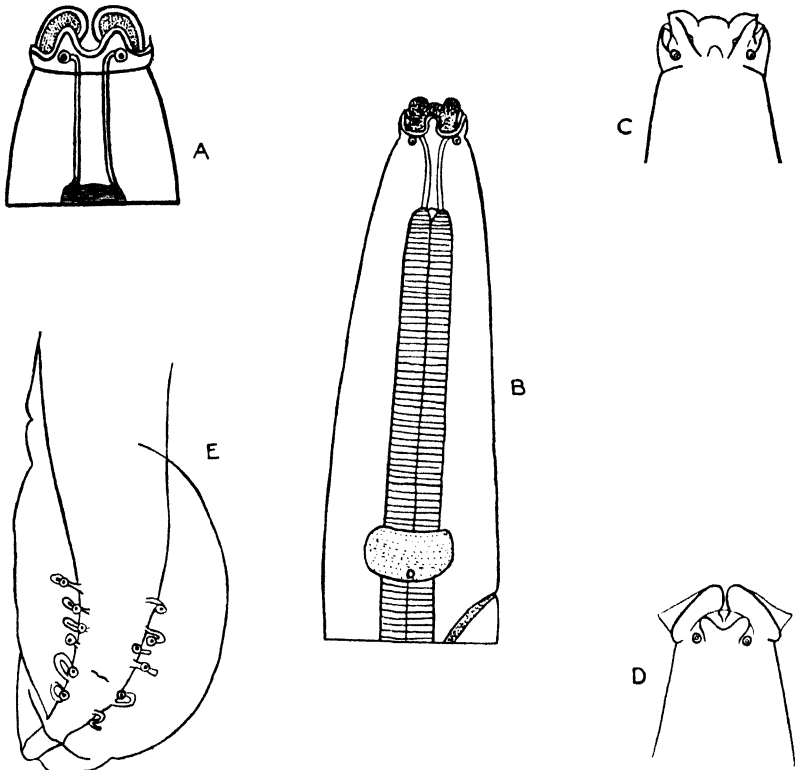


Fig. 207.—*Hadjelia lhuillieri*. A. Anterior extremity, ventral view. B. Anterior extremity, lateral view. (After Seurat.) *Hadjelia inermis*. C. Anterior extremity, lateral view. D. Anterior extremity, ventral view. E. Posterior extremity of male, ventral view. (After Gendre.)

lateral flanges absent; mouth cavity leads into a cylindrical vestibule; œsophagus divided into two parts, the anterior being the shorter. Male: posterior extremity conical and slightly coiled; large caudal alæ; four pairs of long pedunculated preanal papillæ, two pairs of long pedunculated postanal papillæ, and a pair of sessile papillæ near the tip of the tail; spicules very unequal; gubernaculum absent. Female: posterior extremity



short, rounded and conical; vulva in the anterior part of the body, in front of the posterior extremity of the œsophagus; ovejector elongate; uteri divergent. Oviparous, eggs with a thick smooth shell, slightly thickened at the poles, and containing an embryo at deposition. Parasites of the gizzard of birds.

Type species: *H. lhuillieri* Seurat, 1916. ♂ unknown, ♀ 18–22 mm. In *Caccabis petrosa*.

Other species:

*H. inermis* (Gedoelst, 1919). In *Cranorrhinus corrugatus*,

*Lophoceros* sp., *Irrisor* sp., *Oriolus* sp., *Halcyon* sp., etc.

Syn., *Gilsonia inermis* Gedoelst, 1919.

*H. parva* Gendre, 1923. In *Trachelotis senegalensis*.

*H. truncata* (Creplin, 1825). In *Upupa* sp. and *Coracias* sp.

Syn., *Spiroptera truncata* Creplin, 1825.

Refs. 112, 156, 179, 180, 533.

The genera *Cyrnea* and *Hadjelia* seem to be very closely allied to *Habronema*.

#### Subfamily SPIROXYINÆ Baylis and Lane, 1920.

*Definition*.—SPIRURIDÆ: mouth with large distinctly trilobed lips; the cuticle of the inner surface is thickened and thrown into folds and tends to interlock with that of the outer lip; vestibule present without ring-like or spiral thickenings; cephalic and œsophageal regions not ornamented with cuticular plaques.

#### KEY TO GENERA.

1. Vestibule long and cylindrical . . . . . Protospirura, p. 304.  
    Vestibule short . . . . . 2
2. Spicules subequal, gubernaculum  
    absent . . . . . Spiroxys, p. 302.  
    Spicules very unequal, gubernaculum  
    present . . . . . Hartertia, p. 305.

#### Genus SPIROXYS Schneider, 1866.

*Definition*.—SPIROXYINÆ: mouth with two large distinctly trilobed lateral lips each having the cuticle of its inner surface thickened, tending to interlock with that of the opposite lip, and provided with teeth; mouth cavity leads into a short vestibule; œsophagus cylindrical and divided into an anterior muscular and a larger posterior glandular portion. Male: well-developed caudal alæ, and a preanal vesicular swelling, supported by nine pairs of pedunculated papillæ, of which three pairs are preanal, and in

addition, there are two pairs of ventral sessile papillæ, one in front of, and one behind, the cloaca; spicules delicate and sub-equal; gubernaculum absent. Female: vulva near the middle

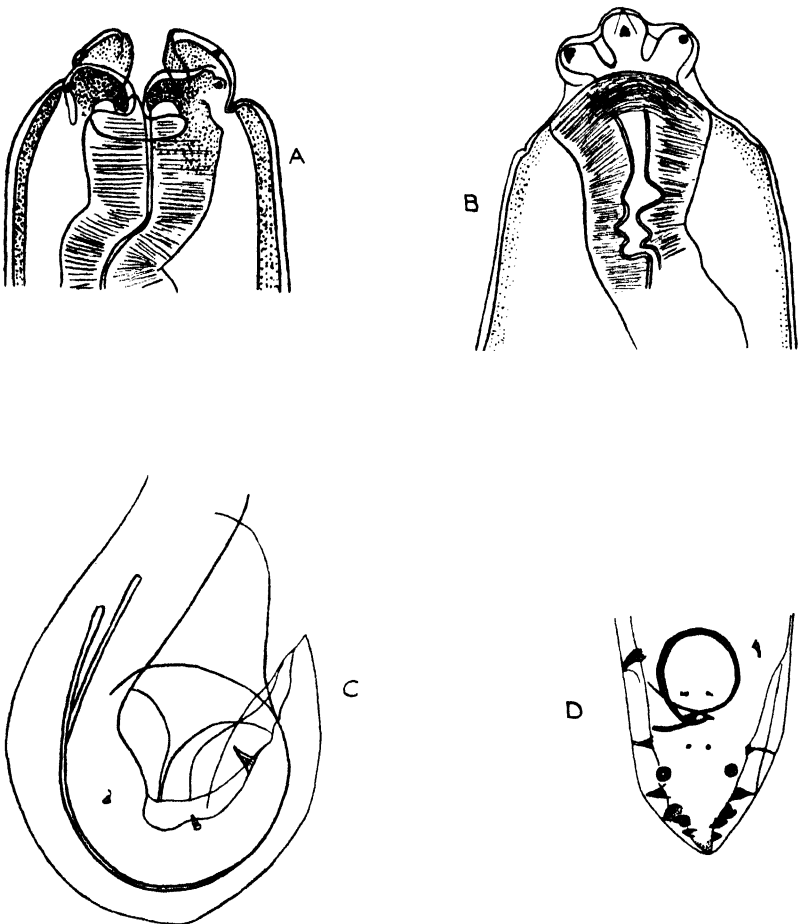


Fig. 208. *Spiroxys contorta*. A. Anterior extremity, ventral view.  $\times 160$ . B. Anterior extremity, lateral view.  $\times 160$ . C. Posterior extremity of male, lateral view.  $\times 36$ . D. Posterior extremity of male, ventral view.  $\times 48$ . (After Baylis and Lane.)

of the body; vagina directed anteriorly; uteri divergent. Oviparous, eggs with a thin colourless stippled shell, from which the unsegmented granular contents are separated by a space. Parasites of stomach wall of tortoises and ? snakes.

Type species: *S. contorta* (Rud., 1819). ♂ 15–25 mm., ♀ 20–30 mm. In *Emys* spp..

Syn., *Spiroptera contorta* Rud., 1819,

Other species :

*S. annulata* Baylis and Daubney, 1922. In *Chitra indica*.

*S. gangetica* Baylis and Lane, 1920. In *Trionyx gangeticus*.

? *S. constricta* (Leidy, 1856). In *Tropidonotus* sp.

Refs. 42, 46, 271, 444, 477, 480, 545.

Genus **PROTOSPIRURA** Seurat, 1914.

*Definition*.—**SPIROXYINÆ** : body regularly attenuated anteriorly, mouth with two large lateral trilobed lips each bearing three papillæ, each lobe is provided with teeth on its internal surface ;

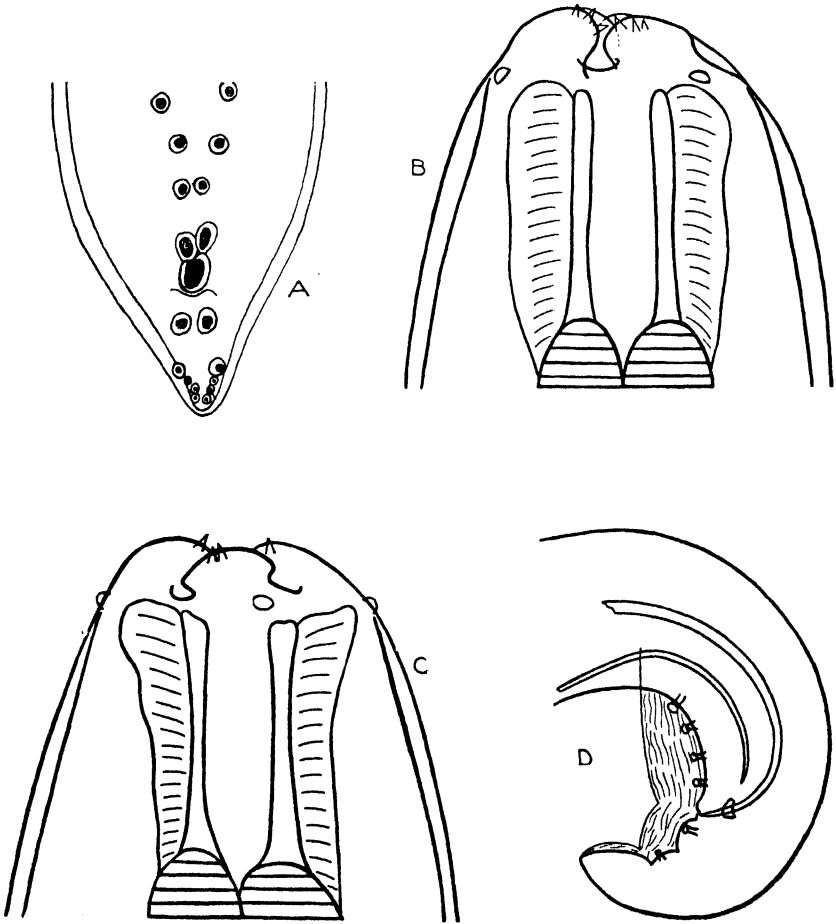


Fig. 209. *Protospirura numidica*. A. Posterior extremity of male, ventral view. (After Seurat.) *Protospirura ascaroidea*. B. Head, ventral view.  $\times 160$ . C. Head, lateral view.  $\times 160$ . D. Posterior extremity of male, lateral view.  $\times 23$ . (Orig.)

cuticular lateral flanges absent ; cervical papillæ very anterior, in front of the nerve ring ; vestibule cylindrical and long ; œsophagus very long, divided into two parts. Male : posterior extremity spiral ; large cylindrical caudal alæ present ; four pairs of slightly pedunculated preanal papillæ and two pairs of large postanal papillæ, also three or four pairs of small papillæ near the tip of the tail ; spicules unequal or subequal ; gubernaculum present. Female : tail conical and very short ; vulva towards the middle of the body, or anterior to it ; ovejector relatively short and simple ; uteri divergent. Oviparous, eggs oval with a thick shell and containing an embryo when deposited. Parasites of mammals.

Type species : *P. numidica* Seurat, 1914. ♂ 22 mm., ♀ 35 mm. In *Felis ocreata*.

Other species :

*P. ascaroidea* Hall, 1916. In *Geomys breviceps*.

*P. bonnei* Ortlepp, 1924. In rats.

*P. gracilis* Cram, 1924. In cats.

*P. guianensis* Ortlepp, 1924. In Monki-monki.

*P. labiodentata* (Linstow, 1899). In *Mus navalis*.

*P. muris* (Gmelin, 1790). In *Mus decumanus*.

Syn., *Spiroptera obtusa* Rud., 1819.

*P. muricola* Geddoelst, 1916. In rats.

Refs. 111b, 205, 381a, 511, 514, 526.

#### Genus **HARTERTIA** Seurat, 1914.

*Definition*.—**SPIROXYINÆ** : mouth with two large lateral trilobed lips, with the cuticle of their inner surfaces thickened, bearing teeth, thrown into folds, and interlocking with those of the opposite side ; each lip is provided with a lateral and a pair of submedian papillæ ; lateral flanges very narrow and limited to the anterior part of the body ; cervical papillæ very anterior, just behind the lips ; mouth cavity followed by a short vestibule ; œsophagus divided into two parts, the anterior short and muscular. Male : posterior extremity straight ; large caudal alæ, with four pairs of pedunculated preanal and two pairs of pedunculated postanal papillæ, and four pairs of sessile papillæ near the tip of the tail ; spicules very unequal ; gubernaculum present. Female : posterior extremity conical and rounded at the tip ; vulva near the middle of the body. Oviparous, eggs with a thick double shell with a very distinct vitelline membrane, containing a larva when deposited. Parasites of birds.

Type species : *H. obesa* Seurat, 1915. ♂ 23.5 mm., ♀ 40.8 mm. In *Caccabis petrosa spatzi*.

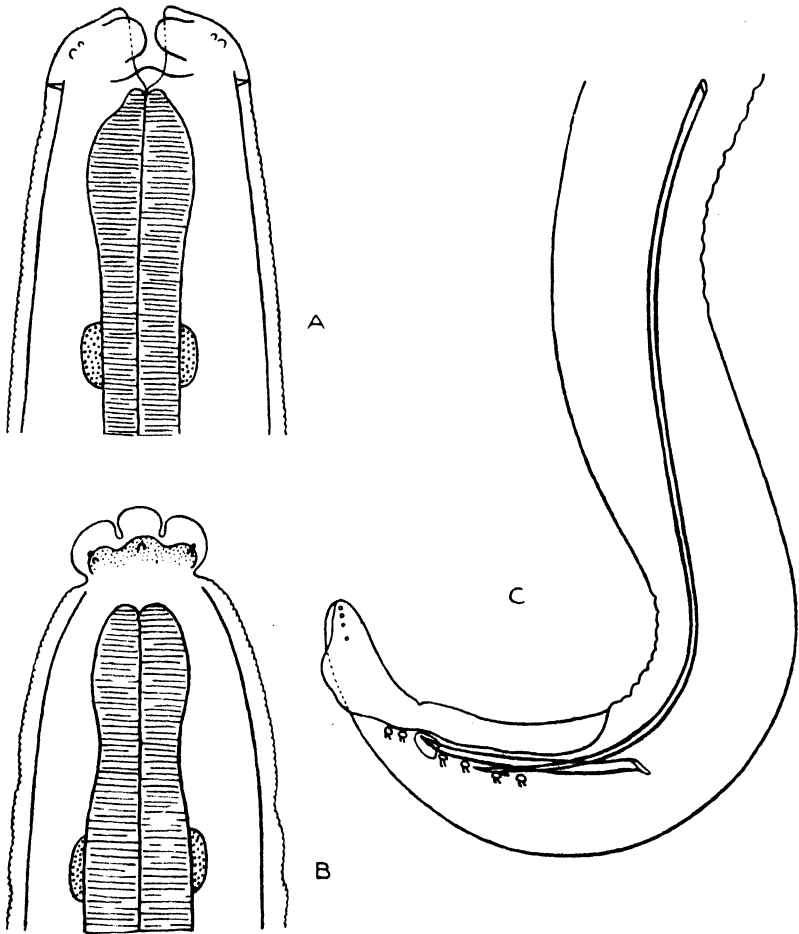


Fig. 210.—*Hartertia obesa*. A. Anterior extremity, ventral view.  $\times 90$ . B. Anterior extremity, lateral view.  $\times 90$ . C. Posterior extremity of male, lateral view.  $\times 44$ . (Orig.)

Other species : *H. rotundata* (Linstow, 1883). In *Otis macquini*.  
Syn., *Filaria rotundata* Linstow, 1883.

Refs. 514, 524, 572.

**Subfamily ARDUENNINÆ Railliet and Henry, 1911.**

**Definition.**—SPIRURIDÆ : mouth with two lateral lips (Piana states that in *Simondsia* they are dorso-ventral) ; vestibule large and cylindrical, walls furnished with cuticular ridges in the form of rings or spirals. Cephalic and œsophageal regions not ornamented with cuticular plaques.

KEY TO GENERA.

1. Prominent rosette-like excrescence towards posterior end of body of female containing uterus, which gives off many branches terminating blindly . . . . . *Simondsia*, p. 309.  
     Female without the above . . . . . 2
2. Vestibule with spiral twist or S-shaped bend . . . . . *Streptopharagus*, p. 311.  
     Vestibule straight . . . . . 3
3. Vestibule with spiral markings.  
     Male with pericloacal crown . . . *Arduenna*, p. 307.  
     Vestibule with transverse markings.  
     Male without pericloacal crown . . *Physocephalus*, p. 308.

Genus **ARDUENNA** Railliet and Henry, 1911.

*Definition.*—**ARDUENNINÆ**: mouth with two lateral trilobed lips, each bearing three papillæ externally, and a tooth on each

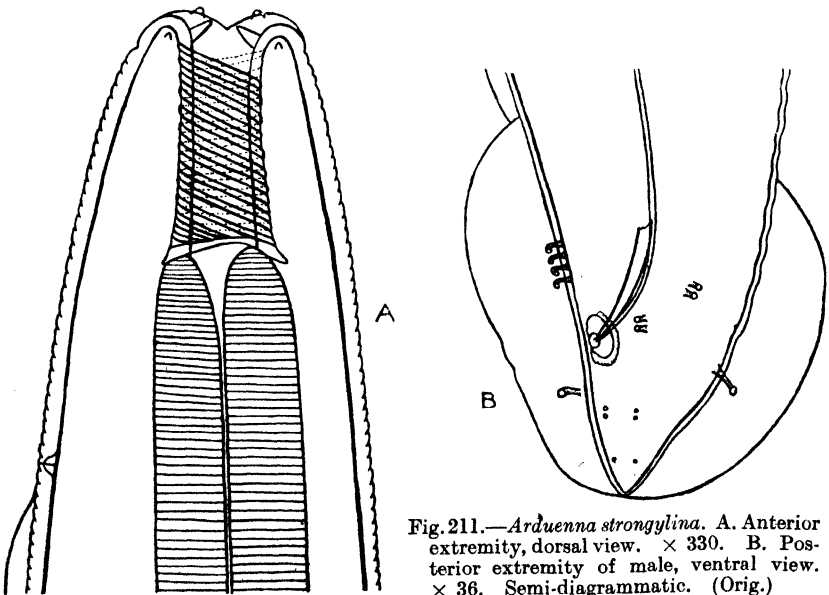


Fig. 211.—*Arduenna strongylina*. A. Anterior extremity, dorsal view.  $\times 330$ . B. Posterior extremity of male, ventral view.  $\times 36$ . Semi-diagrammatic. (Orig.)

side internally; lateral flange on left side only; cervical papillæ asymmetrical, one in front of the nerve ring; mouth followed by

a cylindrical vestibule with a stout wall showing spiral markings ; œsophagus long and divided into two parts, the anterior much the shorter. Male : tail inrolled ; large, asymmetrical caudal alæ present ; cloaca surrounded by a serrate pericloacal crown ; four pairs of pedunculated preanal papillæ, one pair of pedunculated postanal, and one or two pairs of sessile papillæ near the tip of the tail ; spicules very unequal and dissimilar ; gubernaculum absent. Female : vulva in front of the middle of the body. Oviparous, eggs ellipsoidal with a thick shell, and containing an embryo at deposition. Parasites of stomach of pigs.

Type species : *A. strongylina* (Rud., 1819). ♂ 10–13 mm., ♀ 15–20 mm. In pigs.

Syn., *Spiroptera strongylina* Rud., 1819.

Other species : *A. dentata* (Linstow, 1904). In pigs.

Refs. 325, 432, 477.

#### Genus **PHYSOCEPHALUS** Dies., 1861.

Syn., *Leiuris* Leuck., 1850, preoccupied.

*Definition*.—**ARDUENNINÆ** : mouth with two lateral trilobed lips, each bearing three papillæ externally, but without teeth internally ; cervical cuticle inflated ; a triple cuticular flange on each side ; cervical papillæ asymmetrical, one in front of the nerve ring ; vestibule cylindrical with ring-like thickenings of the walls ; œsophagus long and divided into two parts, the anterior much the shorter. Male : tail inrolled ; caudal alæ present ; four pairs of pedunculated preanal papillæ, four pairs of very small papillæ near the tip of the tail ; spicules very unequal ; gubernaculum present ; no pericloacal crown. Female : vulva usually behind the middle of the body. Oviparous, eggs subcylindrical with a thick shell, containing an embryo at deposition. Parasites of stomach of pigs, dromedary, donkey, etc.

Type species : *P. sexalatus* (Molin, 1860). ♂ 7–13 mm., ♀ 10–12 mm. In pig.

Syn., *Spiroptera sexalata* Molin, 1860.

Other species :

*P. cristatus* (Seurat, 1912) Railliet, 1915. In the dromedary and ass.

Syn., *Spiroptera sexalata* var. *cristata* Seurat, 1912.

*P. gracilis* (Rud., 1819). In *Bradypus tridactylus*.

*P. leptcephalus* (Rud., 1819). In *Bradypus tridactylus*.

Syn., *Leiuris leptcephalus* (Rud., 1819).

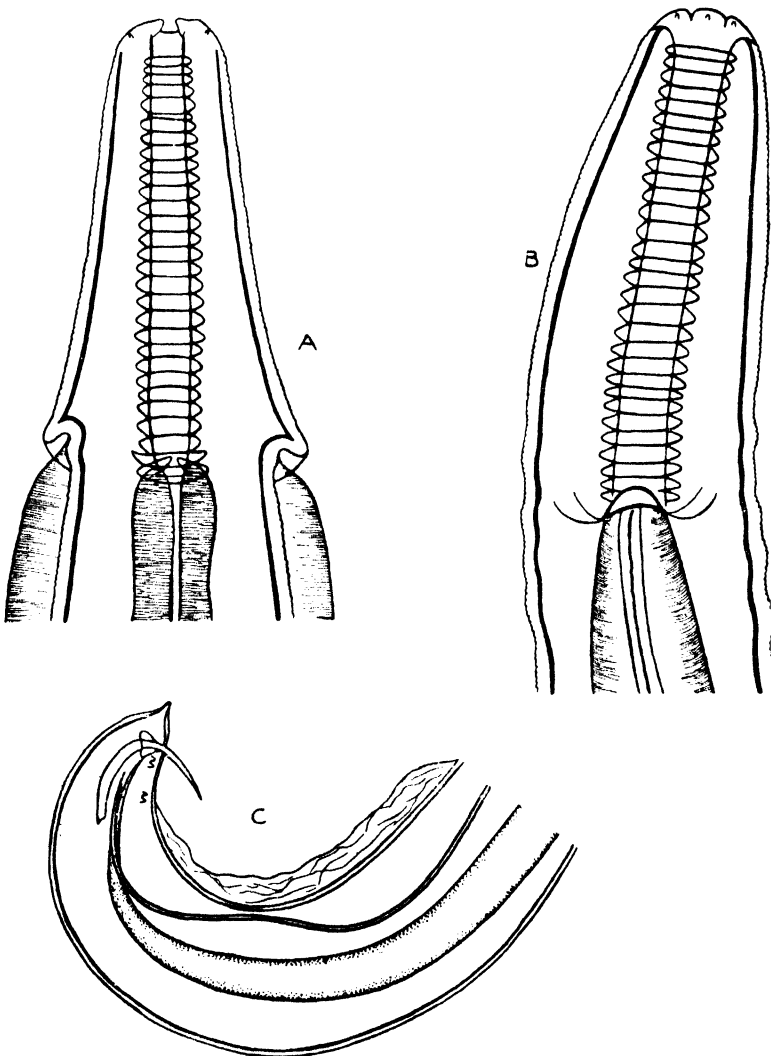


Fig. 212.—*Physocephalus sexalutus*. A. Anterior extremity, ventral view.  $\times 215$ . B. Anterior extremity, lateral view.  $\times 215$ . C. Posterior extremity of male, lateral view.  $\times 46$ . (Orig.)

*P. mediospiralis* (Molin, 1860). In *Dasyprocta agouti*.

Syn., ? *Spiroptera chrisoptera* Molin, 1858.

Refs. 95, 125, 128, 298, 358, 368, 432, 484, 492.

Genus **SIMONDSIA** Cobbold, 1864.

*Definition*.—**ARDUENNINÆ**: mouth with two lips (stated by Piana to be dorsal and ventral); vestibule cylindrical, with



ringed thickenings; œsophagus long and cylindrical. Male: posterior extremity conical and spirally curved; caudal alæ present; four pairs of pedunculated preanal papillæ; spicules unequal. Female: body of more or less uniform diameter, but supporting externally a large rosette-shaped excrescence containing the uterus, the walls of which are expanded with branches terminating in cæca; vulva in the anterior half of the body. Males free in stomach of pigs, females encysted within the stomach wall with their heads projecting into the cavity.

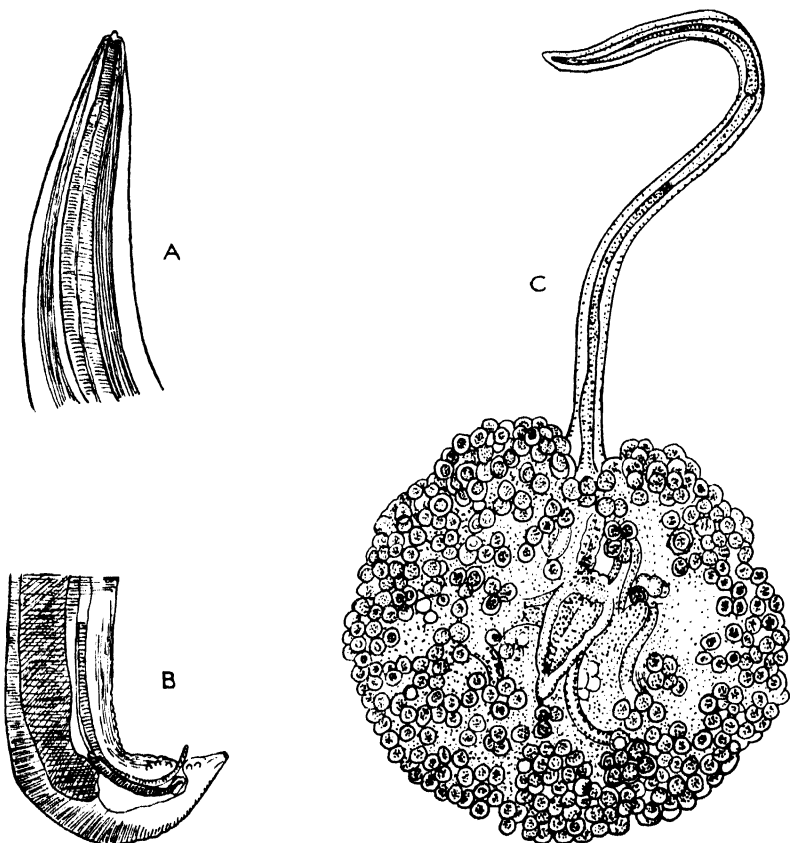


Fig. 213.—*Simondsia paradoxa*. A. Anterior extremity. B. Posterior extremity of male, lateral view. (After Piana.) C. Female. (After Cobbold.)

taining the uterus, the walls of which are expanded with branches terminating in cæca; vulva in the anterior half of the body. Males free in stomach of pigs, females encysted within the stomach wall with their heads projecting into the cavity.

Type species: *S. paradoxa* Cobbold, 1864. ♂ 12 mm., ♀ 15 mm. In pigs.

Refs. 106, 108, 391, 432.

Genus **STREPTOPHARAGUS** Blanc, 1912.

*Definition*.—**ARDUENNINÆ**: mouth hexagonal, long axis dorso-ventral, with small trilobed lateral lips each with a large lateral, ventral,

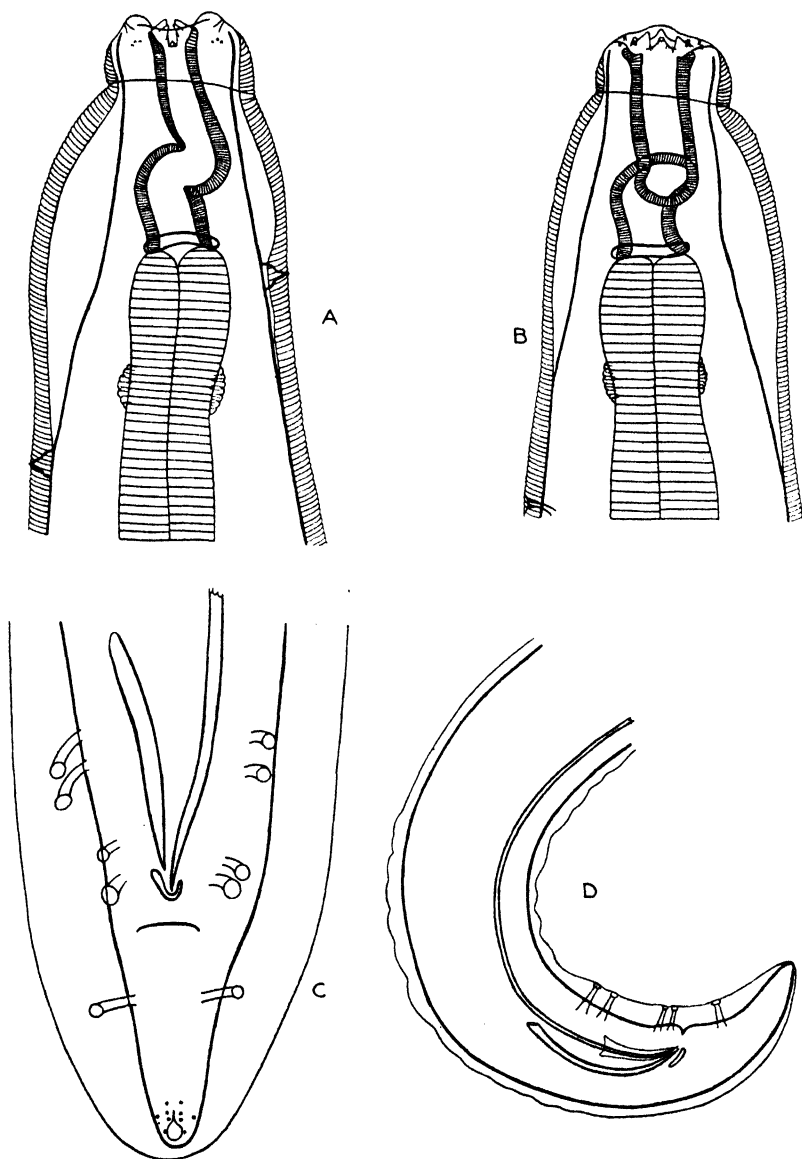


Fig. 214.—*Streptopharagus armatus*. A. Anterior extremity, ventral view.  $\times 76$ . B. Anterior extremity, lateral view.  $\times 76$ . C. Posterior extremity of male, ventral view.  $\times 64$ . D. Posterior extremity of male, lateral view.  $\times 32$ . (Orig.)

and two groups of three small submedian, papillæ ; cervical cuticle inflated asymmetrically ; cervical papillæ asymmetrical, one in front of the nerve ring. Buccal cavity continuous posteriorly with a thick walled tubular vestibule marked with more or less coarse transverse ridges, and forming about the middle of its length a half turn of a spiral ; at the anterior end of the vestibule are a number of teeth projecting into the buccal cavity—a small, simple or complex, dorsal and ventral tooth and three larger lateral teeth on each side ; œsophagus consists of two parts, a short narrow muscular anterior portion, and a long wider partly glandular posterior part. Male : tail spiral ; caudal alæ broad ; four pairs of large pedunculated preanal papillæ, one pair of pedunculated postanal papillæ, and a group of five pairs of small sessile papillæ near the tip of the tail ; on the left side of the tail, towards the mid-ventral line, and extending across it in front of the cloacal aperture, a series of prominent claw-like cuticular structures, having their tips hooked and appearing as if chitinized, is sometimes seen (Baylis, 1923) ; spicules very unequal and dissimilar ; a small asymmetrical gubernaculum present. Female : tail conical, with a pair of subventral papillæ ; vulva in front of the middle of the body ; uteri at first parallel, but eventually opposed. Oviparous, eggs with thick shells, and containing embryos at deposition. Parasites of stomach of mammals.

Type species : *S. armatus* Blanc, 1912. ♂ 30–32 mm., ♀ 47–48 mm. In *Macacus* spp.

Other species :

*S. numidicus* Seurat, 1917. In *Fennecus zerda*.

*S. pigmentatus* (Linst., 1897). In *Cercopithecus* sp., *Macacus* sp.

*S. sudanensis* Baylis, 1923. In *Gerbillus gerbillus*.

Refs. 33, 54, 362, 542, 552, 655.

#### Subfamily GONGYLONEMINÆ Hall, 1916.

*Definition*.—SPIURIDÆ : mouth with four or six small and indefinite lips ; vestibule short, narrow, and cylindrical ; anterior end of the body ornamented with cuticular plaques.

#### KEY TO GENERA.

- With numerous cuticular plaques in the cephalic and œsophageal regions . *Gongylonema*, p. 313.  
 With only four cuticular plaques, dorsally and ventrally, in the cephalic region . *Squamanema*, p. 315.

Genus **GONGYLONEMA** Molin, 1857.

Syn., *Myzomimus* Stiles, 1892.

*Definition.*—**GONGYLONEMINÆ**: mouth with small dorsal and ventral lips, chitinized at their external point and each bearing a

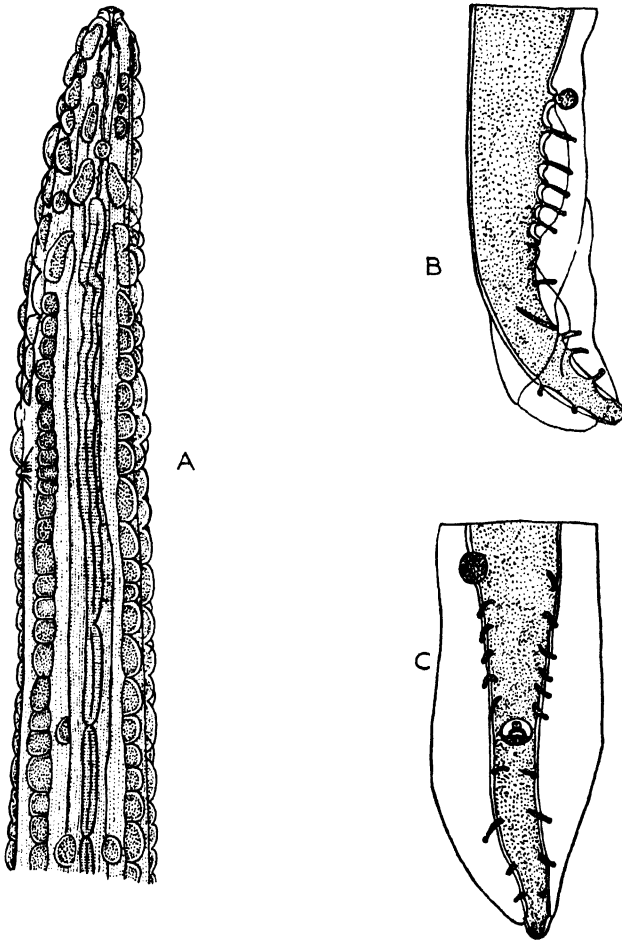


Fig. 215.—*Gongylonema pulchrum*. A. Anterior extremity.  $\times 105$ . (After Ward.) *Gongylonema scutatum*. B. Posterior extremity, lateral view. C. Posterior extremity, ventral view. (After Seurat.)

tooth on its inner surface, lateral lips narrow and small; two lateral and four submedian head papillæ; cuticle thick, with transverse striations; cervical papillæ at the level of the nerve ring, sometimes in the centre of a cuticular plaque; cephalic and

œsophageal regions ornamented with cuticular plaques irregularly arranged in longitudinal rows on the dorsal and ventral parts of the body; lateral cuticular flanges on the anterior part of the body; two unpaired dorsal cuticular papillæ in the intestinal region—one in the anterior third, and the other in the posterior third of the body; vestibule short, narrow, and cylindrical with thick walls; œsophagus very long and consists of two distinct parts, the anterior being much the shorter. Male: tail twisted slightly on its long axis; caudal alæ generally asymmetrical; papillæ long and pedunculated and of variable number, usually four to five or six preanal, and two to four postanal, with a number of sessile papillæ near the tip of the tail; spicules very unequal; gubernaculum present. Female: posterior extremity bluntly rounded; vulva slightly in front of the anus; ovejector very long, about half the length of the worm; uteri divergent. Oviparous, eggs with a thick shell containing a larva at deposition. Parasites of œsophageal and stomach walls of mammals and birds.

Type species: *G. minimum* Molin, 1857. ♂ 8.8 mm., ♀ 17.5–21.6 mm. In *Mus* spp.

Syn., *Filaria musculi* Rud., 1819.

Other species:

*G. brevispiculum* Seurat, 1914. In *Dipodilla campestris*.

\**G. confusum* Sonsino, 1896. In *Equus caballus*.

\**G. hominis* Stiles, 1921. In man.

*G. ingluvicola* Ransom, 1904. In *Gallus domesticus*.

\**G. labiale* (Pane, 1864). In man.

*G. mucronatum* Seurat, 1916. In *Erinaceus algirus*.

Syn., *G. pulchrum* Seurat, 1912 and 1914, not Molin 1857.

*G. neoplasticum* (Fibiger and Ditlevsen, 1914). In *Muridæ* *Cavia* sp., *Lepus* sp.

*G. orientale* Yokogawa, 1925. In rodents.

*G. problematicum* Schulz, 1924. In *Muridæ*.

*G. pulchrum* Molin, 1857. In *Sus scrofa*.

\**G. ransomi* Chapin, 1922. In pigs.

\**G. scutatatum* (Leuck., 1873). In horse, ox, goat, and sheep.

Syn., *Myzomimus scutatus* (Leuckart, 1873) Stiles, 1892.

\**G. spirale* Molin, 1857. In *Cervus dama*.

\**G. subtile* Alessandrini, 1914. In man.

*G. ursi* (Duj., 1845). In *Ursus arctos*.

\* According to Baylis (1925) it is probable that these worms are identical with *G. pulchrum*.

*G. verrucosum* (Giles, 1892). In zebu and sheep.

Syn., *Trichosomum verrucosum* Giles, 1892.

*G. crenatum* Railliet, 1898.

Refs. 3a, 41b, 41c, 41d, 91, 205, 353, 405, 458, 478a, 481b, 487, 530, 557, 592, 661, 668b.

Genus **SQUAMANEMA**\* Thiel, 1925.

*Definition.*—GONGYLONEMINÆ: mouth surrounded by six small lips; cuticle thick with marked transverse striations; in the

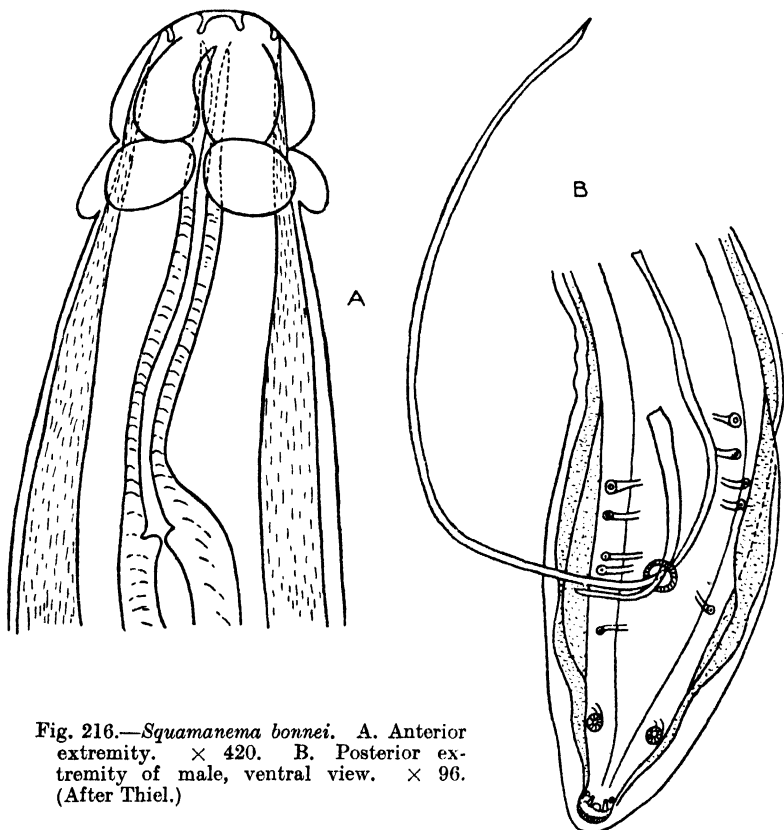


Fig. 216.—*Squamanema bonnei*. A. Anterior extremity.  $\times 420$ . B. Posterior extremity of male, ventral view.  $\times 96$ . (After Thiel.)

cephalic region, dorsally and ventrally, are four cuticular thickenings or shields, the rest of the cuticle is free from plaques; vestibule cylindrical; cervical papillae about the level of the nerve ring; oesophagus of moderate length. Male: posterior extremity twisted spirally; caudal alae slightly asymmetrical; four pairs of long pedunculated preanal papillae, two pairs of

\* Although Thiel considers *Squamanema* to be closely allied to *Gongylonema*, his figure raises in our minds a doubt whether in reality it is not nearer to *Parabronema*.

pedunculated postanal papillæ, and a few sessile papillæ near the tip of the tail; spicules very unequal. Female: posterior extremity digitiform; vulva in the posterior third of the body. Parasites of monkeys.

Type species: *S. bonnei* Thiel, 1925. ♂ 13 mm., ♀ 20 mm. In *Mycetes seniculus*.

Ref. 616a.

### FAMILY THELAZIIDÆ RAILLIET, 1916.

*Definition.*—SPIRUROIDEA: mouth without definite lips, or with two or six small lips; a short buccal capsule or vestibule usually present; œsophagus consists of two parts. Male: with or without caudal alæ, preanal papillæ usually simple, sometimes coupled, generally numerous, and arranged in a linear row; spicules usually very unequal. Female: vulva may be either anterior or posterior. Oviparous or viviparous. Parasites of the orbital, nasal, or oral cavities of mammals and birds, the air-sacs of birds, or of the intestine of fishes.

#### KEY TO GENERA.

1. Spicules equal . . . . . Haplonema, p. 326.  
    Spicules unequal . . . . . 2
2. Males with caudal alæ . . . . . 3  
    Males without caudal alæ . . . . . 4
3. Caudal alæ wide; preanal papillæ  
    simple . . . . . Ceratospira, p. 322.  
    Caudal alæ narrow; preanal papillæ  
    coupled . . . . . Cystidicola, p. 322.
4. Walls of vestibule supported by  
    longitudinal thickenings ending  
    anteriorly as teeth . . . . . Rhabdochona, p. 324.  
    Walls of vestibule without longi-  
    tudinal thickenings . . . . . 5
5. Posterior extremity of both sexes  
    finely pointed . . . . . Oxyspirura, p. 318.  
    Posterior extremity of both sexes  
    bluntly rounded . . . . . 6
6. Vulva near anus . . . . . Desmidocerca, p. 321.  
    Vulva in œsophageal region or close  
    behind it . . . . . 7
7. Males with numerous preanal papillæ . . . . . Thelazia, p. 317.  
    Males without preanal papillæ . . . . . Desmidocercella, p. 321.

Genus **THELAZIA** Bosc, 1819.

*Definition.*—THELAZIIDÆ: mouth without lips, followed by a buccal capsule, the anterior border of which is everted and divided into six festoons by indentations, of which four appear to be occupied by a small refractile papilliform organ; two lateral and four submedian cephalic papillæ; œsophagus moderately short. Male: tail blunt and recurved, without caudal alæ; a large

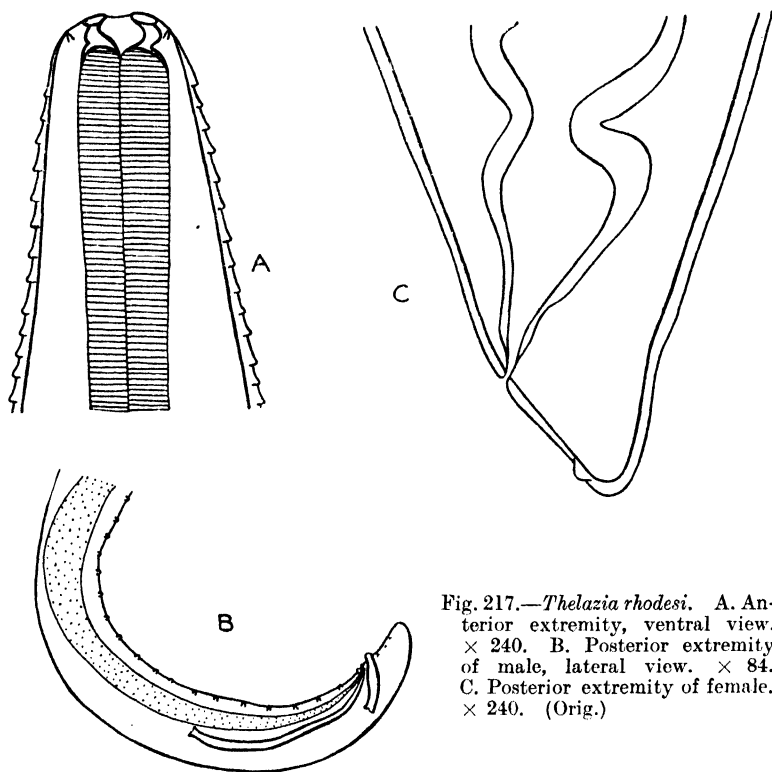


Fig. 217.—*Thelazia rhodesi*. A. Anterior extremity, ventral view.  $\times 240$ . B. Posterior extremity of male, lateral view.  $\times 84$ . C. Posterior extremity of female.  $\times 240$ . (Orig.)

number of preanal papillæ, of which one is unpaired in front of the cloaca, and three or four pairs of postanal papillæ; spicules unequal. Female: tail bluntly rounded, bearing a pair of lateral papillæ near its extremity; vulva in œsophageal region; uterine branches directed backwards and containing embryos. Parasites of the lachrymal ducts and surface of the eye of mammals, or under the nictitating membrane of birds.

Type species: *T. rhodesi* (Desmarest, 1827) Railliet and Henry, 1910. ♂ 8–12 mm., ♀ 12–18 mm. In cattle.

Syn., *T. rhodesii* (Desmarest, 1827) Blainv., 1828. [Thelazie de Rhodes. Bosc, 1819.]



Syn., *Filaria bovis* Baillet, 1858.

*Filaria palpebrarum* Baillet, 1858.

*Filaria lacrymalis* Gurlt of Baillet, 1866, of Railliet, 1893, in part.

Other species :

*T. alfortensis* Railliet and Henry, 1910. In cattle.

Syn., *Filaria lacrymalis* Gurlt of Railliet, 1893, in part.

*T. anolabiata* (Molin, 1860). In *Crax fasciolata*.

*T. callipæda* Railliet and Henry, 1910. In dog.

*T. campanulata* (Molin, 1858). In *Rupornis magnirostris*.

? *T. cirrura* (Leidy, 1886). In *Megaquiscalus major*.

*T. dancelonis* (Breinl, 1913). In *Dacelo leachei*.

*T. depressa* Baylis, 1920. In *Mungos fasciatus*.\*

*T. digitata* Travassos, 1918. In *Rhamphastus* sp.

*T. gulosa* Railliet and Henry, 1910. In cattle.

Syn., *Filaria lacrymalis* Gurlt, 1831, in part.

*T. iheringi* Travassos, 1918. In *Dasyprocta* sp.

*T. lacrymalis* (Gurlt, 1831) Railliet and Henry, 1910. In horse.

Syn., *Filaria lacrymalis* Gurlt, 1831, in part.

*T. leesei* Railliet and Henry, 1910. In camel.

*T. lutzi* Travassos, 1918. In *Penelope* sp.

*T. papillosa* (Molin, 1860). In *Falco* spp.

? *T. stereura* (Rud., 1819). In *Aquila nævia*.

Travassos (1918) has divided the genus *Thelazia* into the following subgenera :—

**Subgenus THELAZIA** (Bosc, 1819) Travassos, 1918.

**Definition.**—THELAZIA in which the spicules are dissimilar and very unequal. Contains the species : *rhodesi*, *campanulata*, *dancelonis*, *depressa*, *gulosa*, *iheringi*, *leesei*, *lutzi*, *papillosa*, and *stereura*.

**Subgenus THELAZIELLA** Travassos, 1918.

**Definition.**—THELAZIA in which the spicules are almost the same size. Contains the species : *lachrymalis*.

Refs. 26, 53a, 53b, 74, 121a, 203a, 358, 404, 421, 425, 633a.

**Genus OXYSPIRURA** Drasche in Stossich, 1897.

Syn., *Cheilospirura* Dies., 1861, in part.

**Definition.**—THELAZIIDÆ : mouth without lips, followed by a short buccal capsule ; head with two lateral and four submedian

\* Baylis informs us that this is not the real host and that he has recently obtained *T. depressa* from a bird.

papillæ, rarely with a cuticular dilatation. Posterior extremity of both sexes very finely conical. Male : tail generally incurved or spiral, caudal alæ absent ; papillæ sessile, the preanal variable

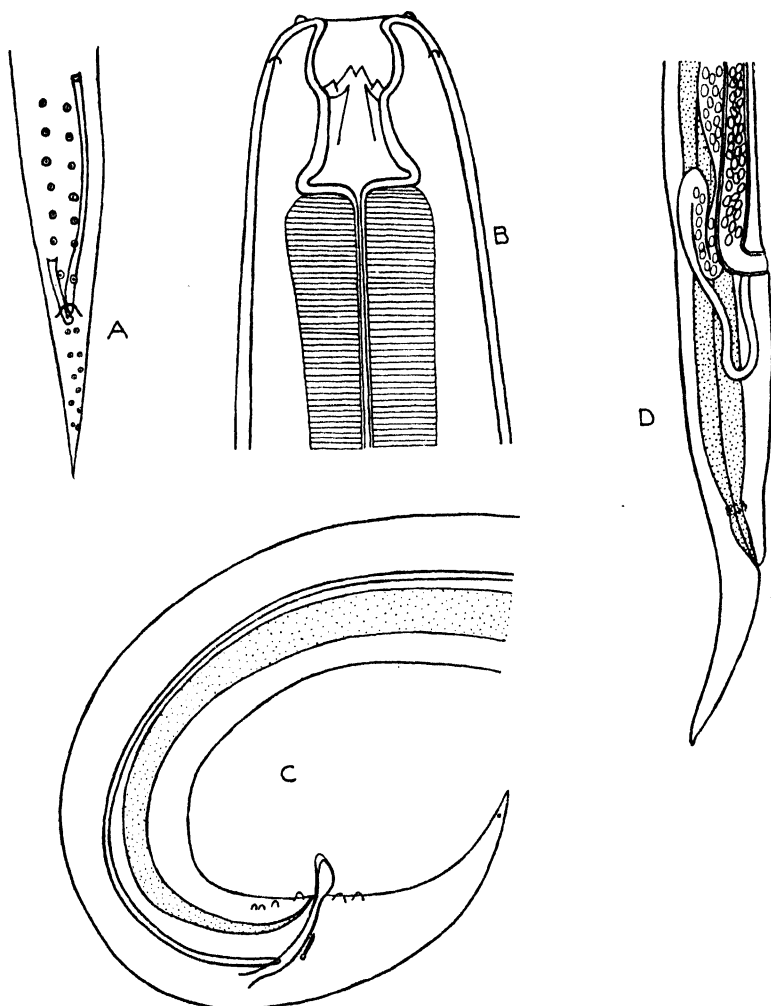


Fig. 218.—*Oxyspirura cephaloptera*. A. Posterior extremity of male, ventral view.  $\times 90$ . (After Drasche.) *Oxyspirura mansonii*. B. Anterior extremity, ventral view.  $\times 375$ . C. Posterior extremity of male, lateral view.  $\times 84$ . D. Posterior extremity of female.  $\times 50$ . (Orig.)

in number (two to twenty-eight pairs), the postanal (one to eight pairs) often asymmetrical ; spicules very unequal. Female : posterior extremity straight ; vulva very little in front of the anus. Parasites under the nictitating membrane of birds.

Type species : *O. cephaloptera* (Molin, 1860). ♂ 13–15 mm.,  
♀ 10–13 mm. In *Momotus brasiliensis*, *Icterus croconotus*.

Syn., *Spiroptera cephaloptera* Molin, 1860.

*Cheilospirura cephaloptera* Diesing, 1861.

Other species :

*O. anacanthura* (Molin, 1860). In *Crotophaga* spp.

*O. anthochæræ* (Johnston, 1912). In *Anthochæra carunculata*.

*O. brevisubulata* (Molin, 1860). In *Otus choliba*.

*O. mansonii* (Cobbold, 1879). In *Gallus* sp., *Meleagris* sp.,  
*Pavo* sp.

*O. ophthalmica* (Linstow, 1903). In *Turnix* sp.

Syn., *Cheilospirura ophthalmica* Linstow, 1903.

*O. parvovum* Sweet, 1910. In *Gallus domesticus*.

*O. siamensis* (Linstow, 1903). In *Centropus sinensis*.

*O. tanasijtchuki* Skrjabin, 1916. In *Icteridæ*.

Also possibly :—

*Spiroptera brevipenis* Molin, 1860. In *Cariama* sp.

*Spiroptera heteroclita* Molin, 1860. In *Nothocrax* sp.

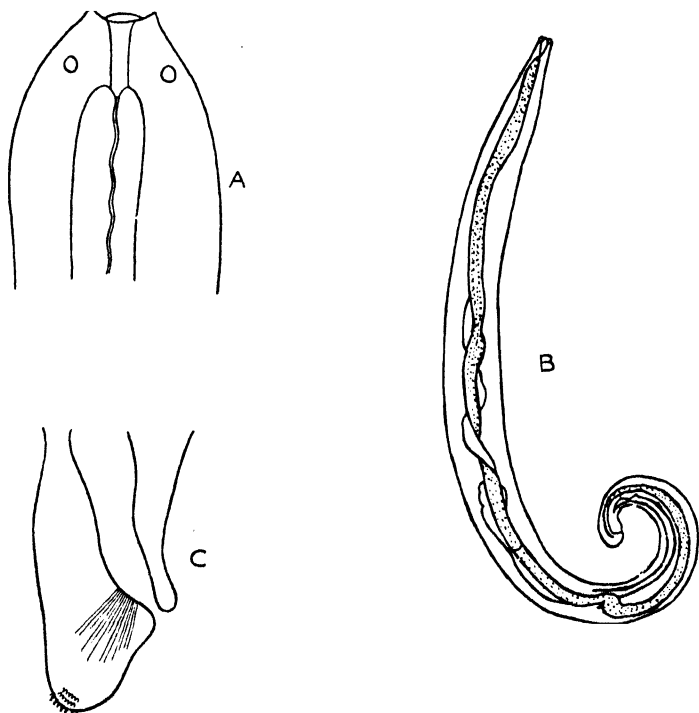


Fig. 219.—*Desmidocerca serophila*. A. Anterior extremity, ventral view.  
B. Male. C. Posterior extremity of female. (After Skrjabin.)

*Spiroptera spiralis* Molin, 1860. In *Bradypus* sp. and *Cholæpus* sp.

*Spiroptera sygmoidea* Molin, 1860. In *Corvus frugilegus*.  
Refs. 103, 128, 358, 404, 454, 574, 604.

**Genus DESMIDOCERCA** Skrjabin, 1916.

*Definition.*—THELAZIIDÆ: very small worms; mouth with two small conical lateral lips, behind which are four submedian head papillæ; vestibule short and cylindrical; œsophagus very long, about two-thirds of the length of the worm. At the caudal extremity of both sexes is a tuft of short filiform processes or spines. Male: posterior extremity bent spirally, tail bluntly rounded; caudal alæ absent, papillæ absent; spicules filiform and very unequal. Female: posterior extremity bent spirally, tail bluntly rounded; vulva in the posterior part of the body. Oviparous, eggs oval. Parasites of the air-sacs of aquatic birds.

Type species: *D. ærophila* Skrjabin, 1916. ♂ 3·9 mm., ♀ 4·4 mm.  
In herons and cormorants.

Ref. 572.

**Genus DESMIDOCERCELLA** n. g.

Syn., *Desmidocerca* Skrjabin of Seurat, 1920.

*Definition.*—THELAZIIDÆ: body short; mouth with two lateral trilobed lips, each bearing two pairs of large head papillæ, the more lateral inserted near the base of the lips; lateral areas broad; lateral flanges present; cervical papillæ at the level of the nerve ring; buccal cavity short and infundibuliform; œsophagus short (one-eighth to one-ninth the length of the worm) and clearly divided into two parts. Male: posterior extremity bent, tail short, bluntly rounded, and bare at its tip; caudal alæ absent; a pair of postanal papillæ immediately behind the cloaca; spicules very unequal. Female: tail short, bluntly rounded, furnished with two small lateral subterminal cuticular swellings; vulva anterior, situated near the posterior end of the œsophagus; amphidelphys. Parasites of the air-sacs of aquatic birds.

Type species: *D. numidica* (Seurat, 1920). ♂ 5·3 mm., ♀ 6·8 mm.  
In herons.

Syn., *Desmidocerca numidica* Seurat, 1920.

Ref. 560.

Genus **CERATOSPIRA** Schneider, 1866.

*Definition.*—THELAZIIDÆ: head bare, mouth surrounded by papillæ, and followed by a short buccal capsule. Male: tail very short, blunt, and furnished with large alæ; preanal papillæ simple and sessile, nine to eleven in number; spicules very unequal. Female: tail very short and blunt; vulva very anterior, near the posterior end of the œsophagus. Oviparous or viviparous. Parasites of the orbital, nasal, and oral cavities of birds.

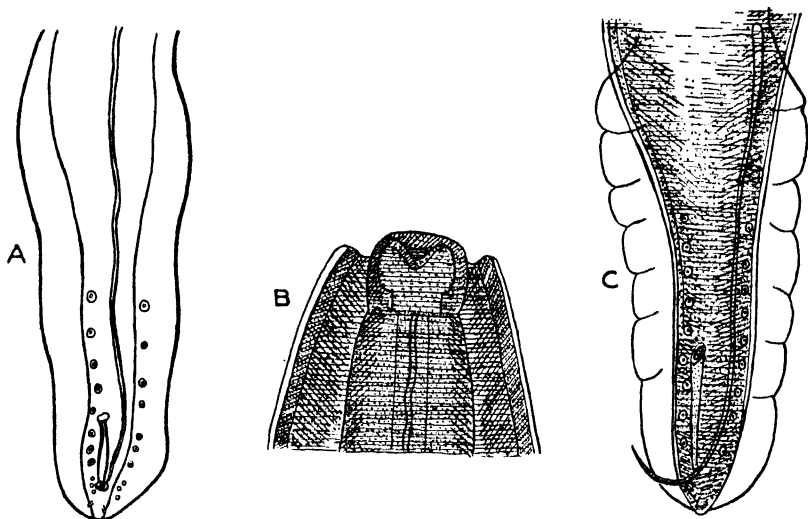


Fig. 220.—*Ceratospira vesiculosa*. A. Posterior extremity of male, ventral view.  $\times 45$ . (After Schneider.) *Ceratospira ophthalmica*. B. Anterior extremity. C. Posterior extremity of male, ventral view. (After Linstow.)

Type species: *C. vesiculosa* Schneider, 1866. ♂ 20 mm., ♀ ?  
In *Eclectus pectoralis*, *Psittacus sinensis*.

Other species:

*C. ophthalmica* (Linst., 1898). In *Zonænas* sp., *Carpophaga* sp.

Syn., *Ancyracanthus ophthalmicus* Linstow, 1898.

Refs. 317, 404, 454, 480.

Genus **CYSTIDICOLA** Fischer, 1798.

Syn., *Fissula* Lamarck, 1801.

*Ophiostoma* Rud., 1801.

*Ancyracanthus* Schneider, 1866, in part, not Diesing, 1838.

*Pseudancyracanthus* Skrjabin, 1923.

*Definition.*—THELAZIIDÆ: mouth simple or with small lips; followed by a cylindrical vestibule with a thick chitinous wall; œsophagus very long. Male: posterior extremity coiled spirally,

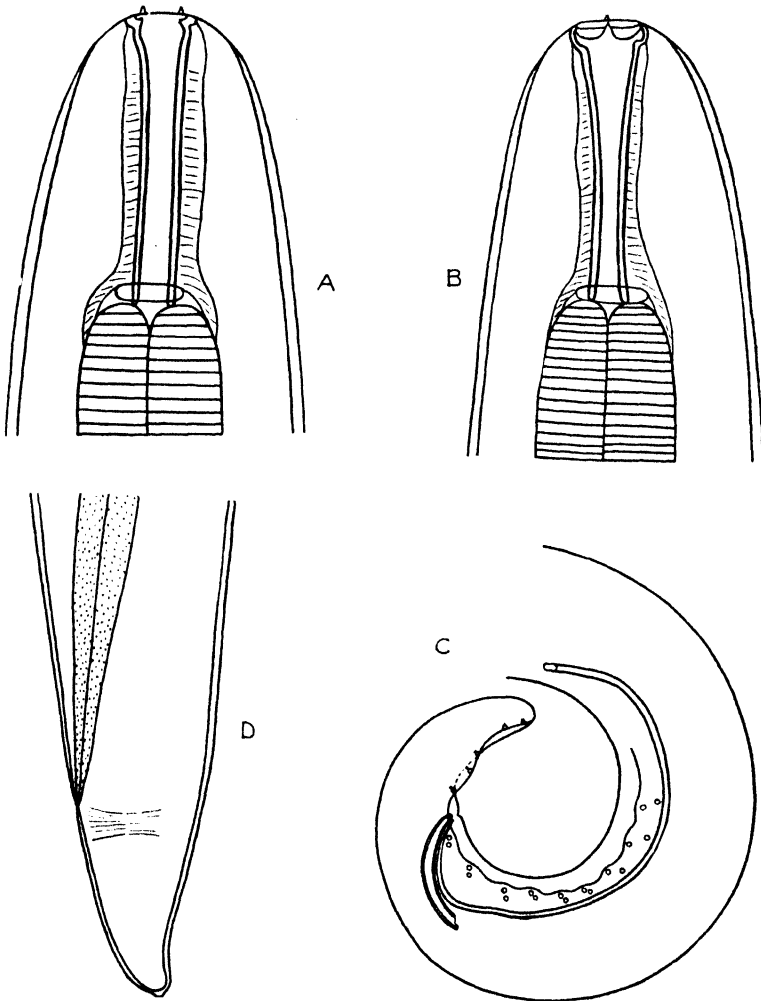


Fig. 221.—*Cystidicola farionis*. A. Anterior extremity, ventral view.  $\times 256$ . B. Anterior extremity, lateral view.  $\times 256$ . C. Posterior extremity of male, lateral view.  $\times 90$ . D. Posterior extremity of female, lateral view.  $\times 90$ . (Orig.)

tail rounded at the tip; caudal alæ narrow; a long row of coupled preanal papillæ, and about five simple postanal papillæ; spicules unequal and dissimilar. Female: tail straight and blunt; vulva in the middle, or in the anterior region, of the body; uteri

opposed. Oviparous, eggs numerous, thick-shelled, provided (at least in the type) with polar filaments. Parasites of the swim-bladder, air-vessels, and rarely cesophagus of fresh-water fishes.

Type species: *C. farionis* Fischer, 1798. ♂ 10–20 mm., ♀ 11–36 mm. In trout, etc.

Syn., *Fissula cystidicola* Lam., 1801.

*Fissula farionis* Bosc, 1802.

*Spiroptera cystidicola* (Lam., 1801) Rud., 1819.

*Ophiostoma cystidicola* (Lam., 1801) Rud., 1809.

*Dispharagus cystidicola* (Lam., 1801) Duj., 1845.

*Ancyracanthus cystidicola* (Lam., 1801) Schneider, 1866.

*Pseudancyracanthus cystidicola* (Lam., 1801) Skrjabin, 1923.

Other species:

*C. impar* (Schneider, 1866). In *Osmerus* sp., *Trutta* sp., *Coregonus* sp., etc.

? *C. serrata* (Wright, 1879). In *Coregonus albus*.

*C. stigmatura* (Leidy, 1886) Ward and Magath, 1916. In trout, etc.

Refs. 131, 135, 274, 373, 404, 477, 480, 566, 581, 662.

#### Genus RHABDOCHONA Railliet, 1916.

Syn., ? *Ichthyospirura* Skrjabin, 1917.

*Pseudancyracanthus* Skrjabin, 1923, in part.

*Definition*.—THELAZIIDÆ: head bare, mouth with two lips bounding an infundibular cavity, supported by longitudinal thickenings terminating anteriorly in pointed teeth; cesophagus of moderate length, composed of two distinct parts. Male: tail conical, pointed, and recurved; caudal alæ absent; numerous simple pre- and post-anal papillæ; spicules unequal. Female: tail straight and elongate; vulva near the middle of the body; uteri opposed. Oviparous, eggs elliptical. Parasites of the intestine of fresh-water fishes.

Type species: *R. denudata* (Duj., 1845). ♂ 6 mm., ♀ 6 mm. In *Cyprinus* sp.

Syn., *Dispharagus denudatus* Duj., 1845.

*Histiocephalus denudatus* (Duj., 1845) Dies., 1851.

*Pseudancyracanthus denudatus* (Duj., 1845) Skrjabin, 1923.

*Cucullanus pachystomus* Linstow, 1873.

? *Dispharagus filiformis* Zschokke, 1884. In *Alburnus lucidus*.

Other species :

*R. acuminata* (Molin, 1860). In *Barbus* sp., *Brycon falcatus*.

*R. cascadilla* Wigdor, 1918. In minnows.

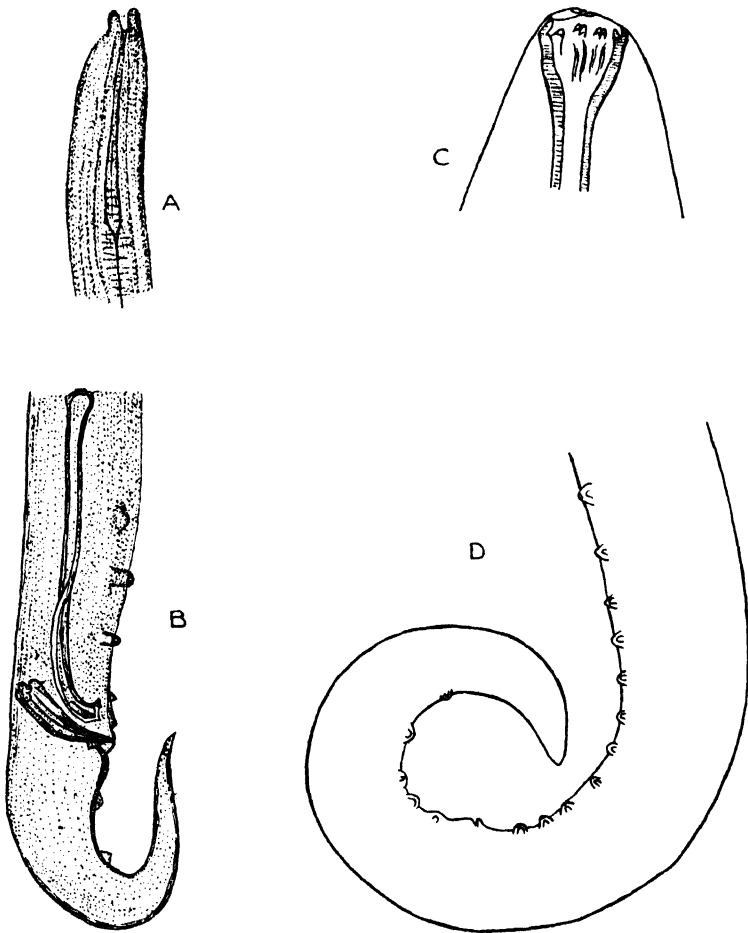


Fig. 222.—*Rhabdochona denudata*. A. Anterior extremity.  $\times 215$ . B. Posterior extremity of male, lateral view.  $\times 150$ . (After Dujardin.) *Rhabdochona acuminata*. C. Anterior extremity. D. Posterior extremity of male, lateral view. (After Gendre.)

*R. gambiana* Gendre, 1922. In a fish.

*R. macrolaima* Gendre, 1922. In a fish.

? *R. turkestanica* (Skrjabin, 1917). In *Schizothorax intermedius*.

Syn., *Ichthyospirura turkestanica* Skrjabin, 1917.

Refs. 131, 178, 404, 581, 666, 682a, 682b.



Genus **HAPLONEMA** Ward and Magath, 1916.

*Definition.*—THELAZIIDÆ: body rather robust, anterior end bent or coiled, mouth without lips, head papillæ absent; lateral flanges present; vestibule absent; œsophagus entirely muscular, but divided into two portions by a partition near its centre, without a posterior bulb. Male: without caudal alæ; two pairs of preanal, and three pairs of postanal papillæ; spicules equal. Female: posterior end of body straight, with two minute papillæ;

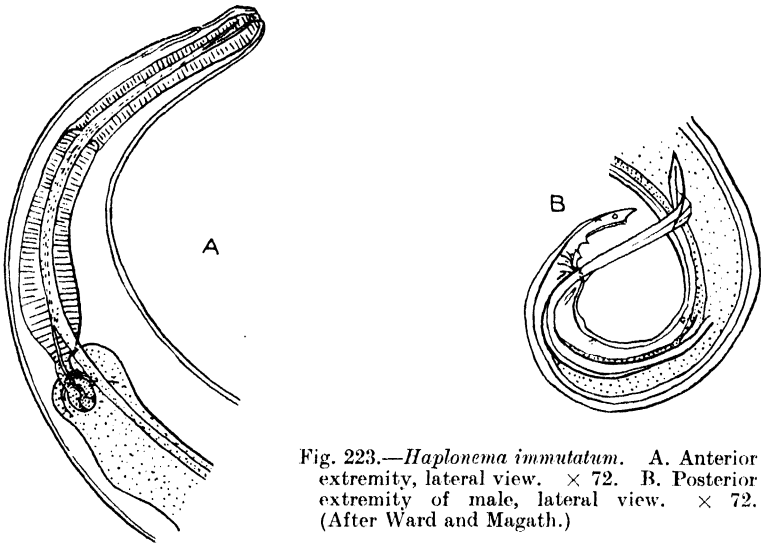


Fig. 223.—*Haplonema immutatum*. A. Anterior extremity, lateral view.  $\times 72$ . B. Posterior extremity of male, lateral view.  $\times 72$ . (After Ward and Magath.)

vulva slightly behind the middle of the body; uteri opposed. Oviparous, eggs with thick smooth shells. Parasites of fresh-water fishes.

Type species: *H. immutatum* Ward and Magath, 1916. ♂ 9.5 mm., ♀ 15 mm. In *Amia calva*.

Ref. 662.

## FAMILY ACUARIIDÆ SEURAT, 1913.

*Definition.*—SPIRUROIDEA: usually with two large simple lateral lips: the anterior part of the body is provided with cutaneous cordons (in the form of epaulettes); long, cylindrical vestibule present; œsophagus cylindrical, divided into two parts; cervical papillæ usually behind the nerve ring; lateral cuticular flanges usually absent. Male: caudal alæ present, with four pairs of long, pedunculated preanal papillæ; spicules unequal, and

usually quite dissimilar. Female : usually with a short muscular ovejector and a short vagina. Parasites of gizzard and intestine of birds and rarely of mammals.

Subfamily ACUARIINÆ Raillet, Henry, and Sisoff, 1912.

*Definition*.—ACUARIIDÆ : with the characters of the family.

#### KEY TO GENERA.

- |   |   |                        |
|---|---|------------------------|
| Anterior end without cuticular thickenings or shields . . . . .   | 1 |                        |
| Anterior end with cuticular thickenings or shields . . . . .  | 4 |                        |
| 1. With large bell-shaped collarette in the region of the cervical papillæ .                              |   | Chevreuria, p. 332.    |
| Without large bell-shaped collarette in the region of the cervical papillæ                                | 2 |                        |
| 2. Cordons very short, in the form of a crescent running from one angle of the lip to the other . . . . . |   | Rusguniella, p. 333.   |
| Cordons long, running relatively far posteriorly . . . . .  | 3 |                        |
| 3. Cuticle with four longitudinal rows of spines . . . . .  |   | Echinuria, p. 331.     |
| Cuticle without spines . . . . .  |   | Acuaria, p. 327.       |
| 4. Cordons with posteriorly directed spines . . . . .   |   | Seuratia, p. 334.      |
| Cordons without spines . . . . .  | 5 |                        |
| 5. With a dorso-ventral cuticular shield, and three short crescentic cordons on each side . . . . .       |   | Parabronema, p. 335.   |
| With two cuticular shields on each side, each bounded by recurved cordons . . . . .                       |   | Cosmocephalus, p. 337. |

#### Genus ACUARIA Bremser, 1811.

Syn., *Spiroptera* Rud., 1819.

*Anthuris* Rud., 1819.

*Dispharagus* Duj., 1845.

*Cheilospirura* Dies., 1861.

*Definition*.—ACUARIINÆ : mouth with two simple lateral lips ; cephalic extremity without any cuticular thickenings or shields,

but with four cordons in the form of ridges or grooves directed posteriorly, frequently turning forwards again and uniting on the lateral surfaces; cervical papillæ behind the nerve ring; lateral flanges absent; vestibule with thick walls, usually transversely striated; œsophagus cylindrical, consisting of two parts. Male: posterior extremity rolled spirally; caudal alæ present; four pairs of pedunculated preanal papillæ, and a variable number of

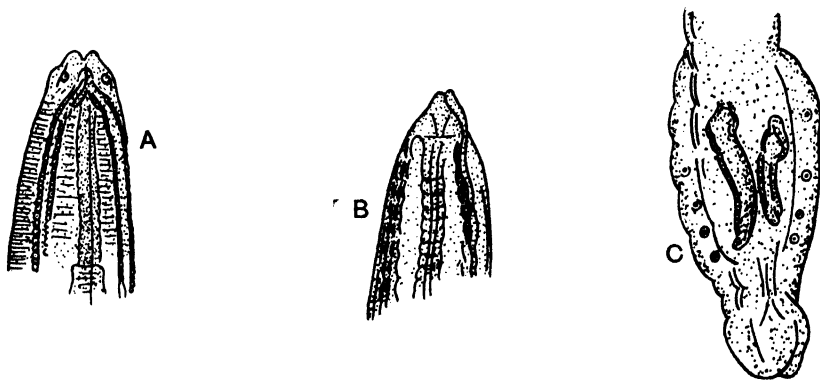


Fig. 224.—*Acuaris (Acuaris) anthuris*. A. Anterior extremity, ventral view.  $\times 66$ . B. Anterior extremity, lateral view.  $\times 66$ . C. Posterior extremity of male, ventral view.  $\times 66$ . (After Dujardin.)

postanal papillæ. Female: posterior extremity blunt; vulva usually in the posterior third of the body; ovejector very short; uteri divergent. Oviparous. Parasites of the œsophagus and gizzard of birds.

Type species: *A. anthuris* (Rudolphi, 1819). ♂ 11 mm., ♀ 22.3 mm. In *Coracias garrula*, *Oriolus galbula*, and *Corvus* spp.

Syn., *Spiroptera anthuris* Rud., 1819.

*Dispharagus anthuris* (Rud., 1819) Duj., 1845.

Other species:

*A. affinis* Seurat, 1916. In *Strix flammea*.

*A. alata* (Rud., 1819). In *Ardea* sp., *Ciconia* sp., and *Buteo* sp.

*A. attenuata* (Rud., 1819). In *Hirundo* spp.

*A. brevicaudata* (Duj., 1845). In *Botaurus stellaris*, *Ardetta minuta*.

*A. capitata* (Molin, 1860). In *Falco minutus*.

Syn., *Dispharagus capitatus* Molin, 1860.

*A. crassissima* (Molin, 1860). In *Rhamphastos* sp.

*A. denticulata* (Molin, 1860). In *Falco* sp.

*A. depressa* (Schneider, 1866). In *Corvus cornix*.

*A. elliptica* (Molin, 1858). In *Falco* sp.

*A. gracilis* (Gendre, 1912). In *Buchanga* sp. and *Oriolus* sp.

*A. gruveli* (Gendre, 1913). In *Francolinus* sp.

*A. hamata* (Linst., 1877). In *Falco nisus*.

*A. hamulosa* (Dies., 1851). In *Phasianus gallus*.

Syn., *Cheilospirura hamulosa* Dies., 1851.

*A. invaginata* (Linst., 1901, of Gendre, 1913). In *Bubulcus lucidus*.

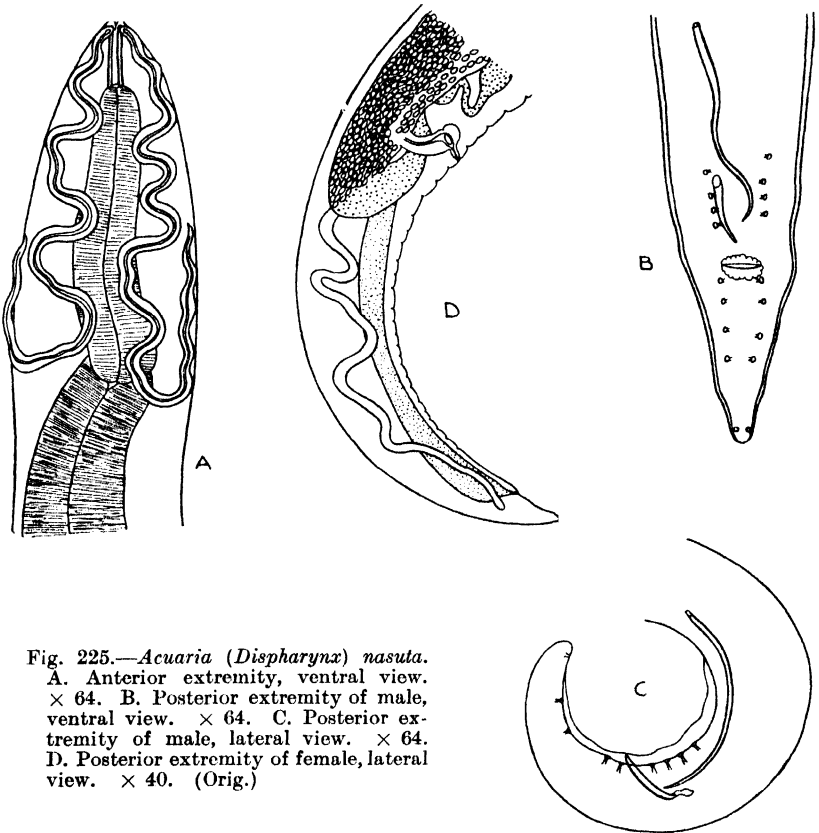


Fig. 225.—*Acuarina (Dispharynx) nasuta*.

A. Anterior extremity, ventral view.  $\times 64$ . B. Posterior extremity of male, ventral view.  $\times 64$ . C. Posterior extremity of male, lateral view.  $\times 64$ . D. Posterior extremity of female, lateral view.  $\times 40$ . (Orig.)

*A. involuta* (Linst., 1879). In *Strix* sp., *Accipiter* sp.

*A. laplantei* Seurat, 1919. In *Garrulus cervicalis*.

*A. laticeps* (Rud., 1819). In *Accipiter nisus*.

*A. longevaginata* (Molin, 1860). In *Ciconia* sp.

*A. macrolaima* (Linst., 1906). In *Plotus* sp.

*A. magnilabiata* (Molin, 1860). In *Platalea* sp.

*A. mamillaris* (Molin, 1860). In *Corvus* sp.

*A. muscicapæ* (Linst., 1878). In *Muscicapa* sp.

*A. nasuta* (Rud., 1819). In *Fringilla domestica*, *Porcellio lævis*, *Gallus* sp.

- A. noctuæ* Seurat, 1913. In *Carine noctua glaux*.  
*A. ornata* (Gendre, 1912). In *Corvus* sp.  
*A. papillifera* (Linst., 1878). In *Sylvia palustris*, *Chelidon* sp.,  
*Cotyle* sp., etc.  
*A. ptilopachydis* Gendre, 1920. In *Ptilopachys fuscus*.  
*A. quadriloba* (Rud., 1819). In *Picus* sp.  
*A. recta* (Molin, 1860). In *Falco* spp.  
*A. rectovaginata* (Molin, 1860). In *Falco* sp.  
*A. rotundata* (Linst., 1907). In *Lanius* sp.  
*A. spiralis* (Molin, 1858). In *Caccabis petrosa*, etc.  
? *A. squamata* (Linst., 1883). In *Phalacrocorax carbo*.  
*A. subrecta* Gendre, 1921. In *Asturinnula* sp.  
*A. subula* (Duj., 1845). In *Sylvia* sp., *Luscinia* sp.  
*A. sygmoidea* (Molin, 1860). In *Falco tridentatus*.  
Syn., *Dispharagus sygmoideus* Molin, 1860.  
*A. tarentolæ* Seurat, 1916. In *Tarentola mauritanica*.  
*A. tenuis* (Duj., 1845). In *Saxicola* sp.  
*A. vanelli* (Rud., 1819). In *Tringa vanellus*.

Railliet, Henry, and Sisoff (1912) have divided the genus *Acuaria* into the following subgenera :—

**Subgenus ACUARIA** (Bremser, 1811) Railliet, Henry, and Sisoff, 1912.

*Definition*.—*Acuaria* : with cordons directed straight backwards, not turning forwards and not anastomosing. Male : with two short slightly unequal spicules ; six to eight pairs of postanal papillæ. Contains the species : *anthuris*, *attenuata*, *depressa*, *gracilis*, *ornata*, *papillifera*, *subula*, *tarentolæ* and *tenuis*.

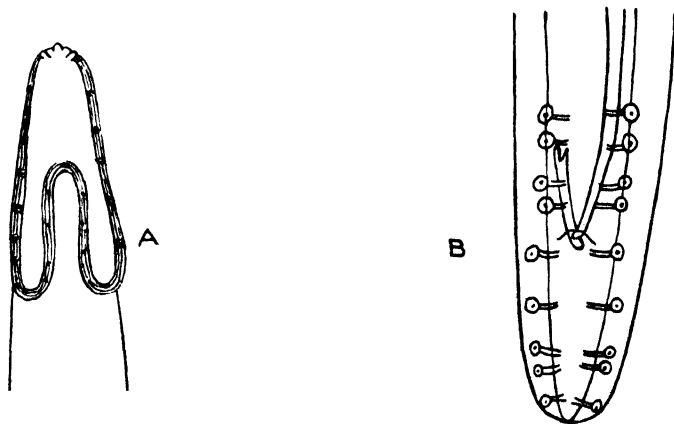


Fig. 226.—*Acuaria* (*Synhimantus*) *laticeps*. A. Anterior extremity, lateral view.  $\times 120$ . B. Posterior extremity of male, ventral view.  $\times 120$ . (After Drasche.)

**Subgenus CHEILOSPIRURA** \* (Dies., 1861) Railliet, Henry, and Sisoff, 1912.

*Definition.*—As *Acuaria* (*Acuaria*), but spicules very unequal and dissimilar; five to seven pairs of postanal papillæ. Contains the species: *hamulosa*, *elongata*, *gruveli*, *magnilabiata*, *recta*, and *rotundata*.

**Subgenus DISPHARYNX** Railliet, Henry, and Sisoff, 1912.

*Definition.*—*Acuaria*: cordons recurrent, but not anastomosing; cervical papillæ not evident. Male: with unequal dissimilar spicules, as a rule five pairs of postanal papillæ. Contains the species: *nasuta*, *capitata*, *crassissima*, *laplantei*, *noctuæ*, *rectovaginata*, and *spiralis*.

**Subgenus SYNHIMANTUS** Railliet, Henry, and Sisoff, 1912.

*Definition.*—*Acuaria*: cordons recurrent and anastomosing on each lateral surface; cervical papillæ tricuspid, when seen. Male: with unequal and dissimilar spicules, ordinarily five pairs of postanal papillæ. Contains the species: *laticeps*, *affinis*, *alata*, *brevicaudata*, *crassicauda*, *denticulata*, *elliptica*, *hamata*, *invaginata*, *involuta*, *longevaginata*, (?) *squamata*, *subrecta*, and *sygmoidea*.

**Subgenus HAMANNIA** Railliet, Henry, and Sisoff, 1912.

This is a synonym of the genus *Echinuria* Solowiow, 1912.

Refs. 75, 131, 167, 168, 169, 170, 172, 174, 358, 452, 477, 533, 572.

**Genus ECHINURIA** Solowiow, 1912.

Syn., *Hamannia* Railliet, Henry, and Sisoff, 1912.

*Definition.*—*ACUARIINÆ*: closely resembling *Acuaria*, cordons not recurrent, but anastomosing posteriorly on the lateral surfaces; cuticle with four longitudinal rows of spines running practically to the posterior extremity. Male: with unequal and dissimilar spicules; four or five pairs of postanal papillæ, or papillæ absent. Female: vulva in the posterior portion of the body, sometimes near the anus. Parasites of birds.

Type species: *E. jugadornata* Solowiow, 1912. ♂ 11–12 mm., ♀ 15–16 mm. In *Anas boschas*.

Other species:

*E. aculeata* (Creplin, 1825). In *Tringa* spp., *Scolopax* sp.

*E. calcarata* (Molin, 1860). In *Ibis* sp.

*E. contorta* (Molin, 1858). In *Ibis* sp.

*E. hargilæ* Baylis and Daubney, 1923. In the adjutant-stork.

*E. leptoptili* Gedoelst, 1916. In *Leptoptilus* sp.

*E. longeorinata* (Molin, 1860). In *Ciconia* sp.

\* As Gendre, 1913, has pointed out, the distinction between the subgenera *Acuaria* and *Cheilospirura* is not sharp, intermediate species existing in which the spicules are only moderately unequal, e.g., *A. subula*, where they measure 0.13 and 0.22 mm. respectively.

- E. phænicopteri* (Seurat, 1916). In *Phænicopterus roseus*.  
*E. spinifera* (Rud., or Schneider) Solowiow, 1912. In  
*Scolopax gallinula*.  
 ? *E. squamata* (Linstow, 1883). In *Phalacrocorax* sp.

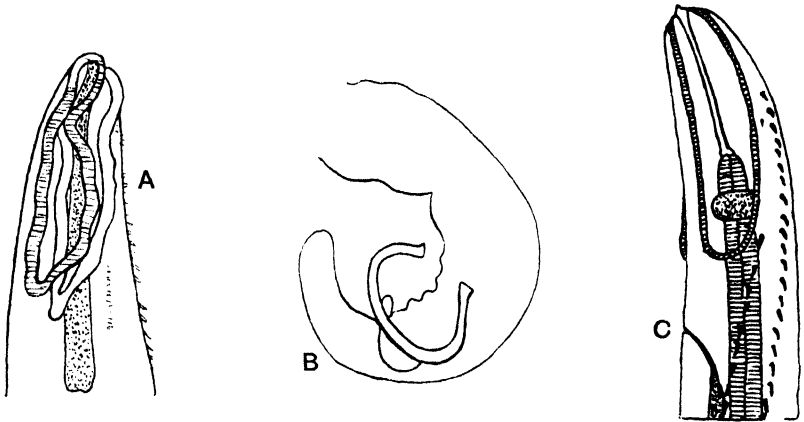


Fig. 227.—*Echinuria jugadornata*. A. Anterior extremity, lateral view. B. Posterior extremity of male, lateral view. (After Solowiow.) *Echinuria phænicopteri*. C. Anterior extremity, lateral view. (After Seurat.)

*E. uncinata* (Rud., 1819). In ducks and geese.

Syn., *Spiroptera uncinata* Rud., 1819.

*Acuaria* (*Hamannia*) *uncinata* (Rud., 1819) Railliet,  
 Henry, and Sisoff, 1912.

Refs. 44, 151, 171, 452, 528, 532, 572, 584.

**Genus CHEVREUXIA Seurat, 1918.**

*Definition*.—**ACUARIINÆ**: mouth bounded by two lateral lips, each of which bears a blunt conical process and a pair of papillæ; cervical papillæ situated far behind the nerve ring, and lying over them is a large collarette, attached anteriorly and with a free bell-shaped posterior margin surrounding this region of the body as a kind of hyaline ring or sheath. In addition, the cuticle is ornamented in the anterior region with four longitudinal cordons arising from the dorsal and ventral lines; these run posteriorly along the submedian lines, and unite on the lateral surfaces in a curve, which lies on the collarette, and fuses with its posterior border; the cordons are flanked on their inner border by a strip of strongly striated cuticle. Mouth cavity infundibular; vestibule long, narrow, and cylindrical; œsophagus clearly divided into two parts, the anterior muscular and surrounded by the nerve

ring, and the posterior glandular. Male: posterior extremity spirally rolled; caudal alæ large; four pairs of pedunculated preanal papillæ, and five pairs of pedunculated postanal papillæ; spicules very unequal. Female: tail short and digitiform; vulva a little behind the middle of the body; ovejector short, directed posteriorly; uteri divergent. Oviparous, eggs with a thick shell, containing a larva at deposition. Parasites of the gizzard wall of birds.

Type species: *C. revoluta* (Rudolphi, 1819). ♂ 6.4 mm., ♀ 18.3 mm. In *Himantopus himantopus*.

Syn., *Spiroptera revoluta* Rudolphi, 1819.

*Dispharagus revolutus* (Rud., 1819) Molin, 1860.

Refs. 477, 547.

Genus **RUSGUNIELLA** Seurat, 1919.

*Definition*.—**ACUARIINÆ**: mouth with two conically projecting lateral lips, each bearing a pair of submedian head papillæ; on each side there is a short crescentic cordon stretching from one angle of the lip to the other, and only reaching a short distance posteriorly along the body; lateral flanges present; cervical papillæ in front of the nerve ring; vestibule cylindrical, with chitinous walls; œsophagus clearly divided into two portions. Male: unknown. Female: posterior extremity bent, elongate, and digitiform; vulva a little in front of the middle of the body; ovejector cylindrical and directed anteriorly; uteri opposed. Oviparous, eggs oval, with a thick shell, containing a larva at deposition. Parasites of œsophagus of birds.

Type species: *R. elongata* (Rudolphi, 1819). ♂ 24 mm., ♀ 24–38 mm. In *Sterna nigra*, etc.

Syn., *Spiroptera elongata* Rudolphi, 1819.

*Filaria elongata* Schneider, 1866.

Refs. 477, 480, 553,

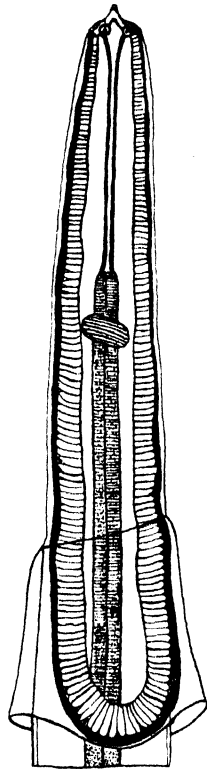


Fig. 228.—*Chevreuxia revoluta*. Anterior extremity, lateral view.  $\times 135$ . (After Seurat.)



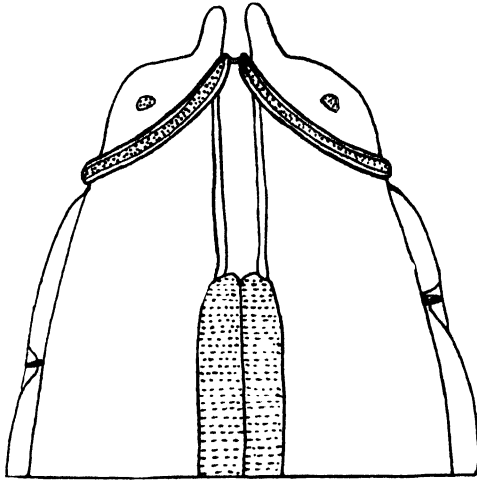


Fig. 229.—*Rusguniella elongata*. Anterior extremity, ventral view. (After Seurat.)

Genus **SEURATIA** Skrjabin, 1916.

Syn., *Prionostemma* Gendre, 1921.

*Definition*.—**ACUARIINÆ**: mouth with two lateral lips, each having a small tooth; vestibule moderately long, narrow, and

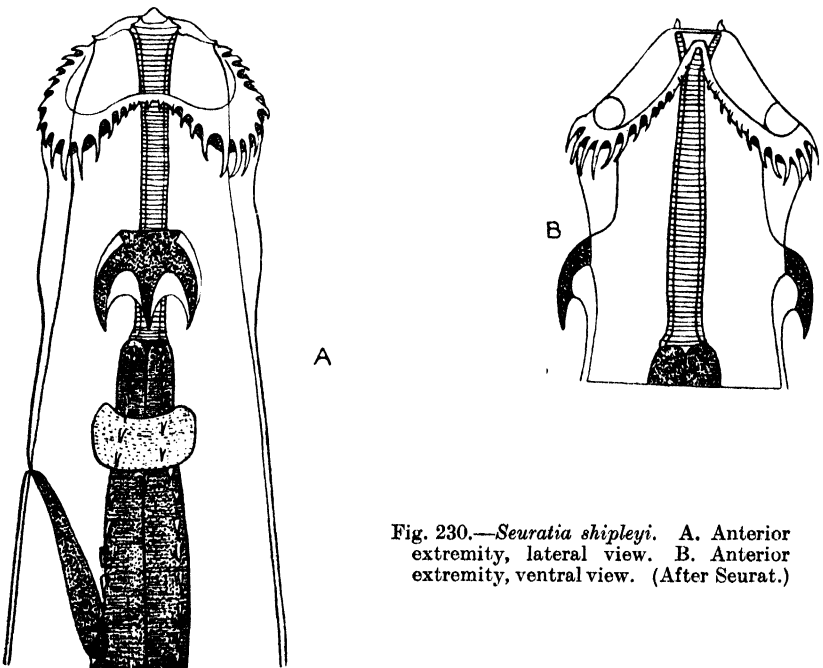


Fig. 230.—*Seuratia shipleyi*. A. Anterior extremity, lateral view. B. Anterior extremity, ventral view. (After Seurat.)

cylindrical, with thick walls, and having a transversely striated appearance ; cephalic region ornamented with four short cordons, slightly recurved and meeting laterally ; these cordons bound areas of raised cuticle, and are provided on their free borders with posteriorly directed spines ; posterior to the cordons on the lateral surface, on each side, is a large trident-shaped chitinous process with the points directed posteriorly ; lateral flanges absent ; the cuticle is, in addition, ornamented along each lateral area with a double row of small posteriorly directed spines gradually disappearing behind the œsophagus and not extending beyond the vulva ; œsophagus cylindrical, divided into two parts, an anterior muscular, and a posterior glandular portion. Male : caudal alæ present, four pairs of preanal and four pairs of postanal papillæ ; spicules unequal. Female : tail short and conical, terminating in a small swelling ; vulva just in front of the middle of the body ; ovejector long ; uteri divergent. Oviparous, eggs oval, small, and contain fully-developed larvæ when deposited. Parasites of birds.

Type species : *S. shipleyi* (Stoss., 1900). ♂ 15 mm., ♀ 32–35 mm.  
In *Diomedea exulans*, *Larus* sp., *Puffinus* sp.

Syn., *Gnathostoma shipleyi* Stossich, 1900.

*Rictularia paradoxa* Linstow, 1904.

*Acuaria pelagica* Seurat, 1916.

Other species :

? *S. decora* (Duj., 1845). In *Alcedo* sp.

*S. procellariæ* (Dies., 1851). In *Procellaria anglorum*.

Syn., *Spiroptera procellariæ-anglorum* Bellingham, 1844.

Refs. 173, 531, 576, 604a.

#### Genus PARABRONEMA Baylis, 1921.

*Definition*.—ACUARIINÆ : mouth with two lateral lips, each with three papillæ ; the cephalic extremity is provided with dorsal and ventral cuticular shields and is ornamented with six horseshoe-shaped cordons ; lateral flanges absent ; the cervical papillæ are a short distance behind the nerve ring ; oral aperture is of greatest diameter dorso-ventrally ; vestibule long and cylindrical with thick walls ; œsophagus consists of two portions, both muscular, the anterior part is short and narrow, and the posterior part longer and broad. Male : posterior extremity spirally coiled ventrally with interrupted longitudinal ridges on the ventral surface posteriorly ; small caudal alæ present ; four pairs of preanal, and two pairs of postanal papillæ arranged somewhat

asymmetrically, and in addition an extra double papilla immediately in front of the cloaca; spicules very dissimilar; gubernaculum triangular. Female: posterior extremity curved

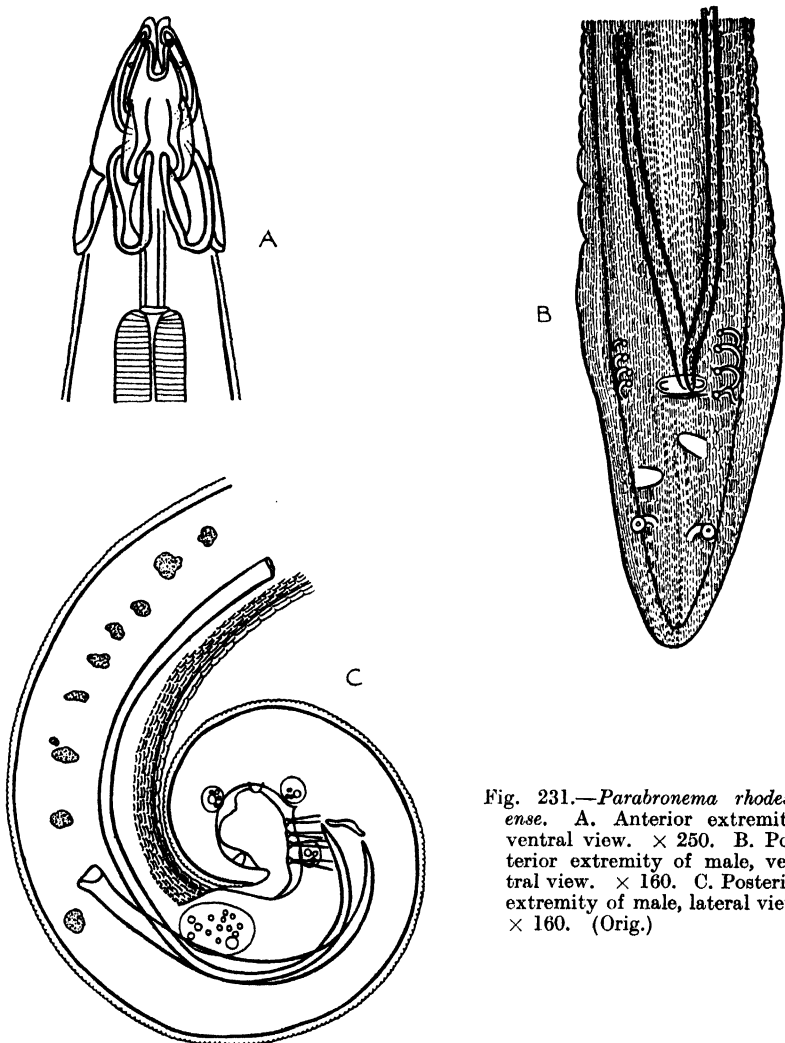


Fig. 231.—*Parabronema rhodesiense*. A. Anterior extremity, ventral view.  $\times 250$ . B. Posterior extremity of male, ventral view.  $\times 160$ . C. Posterior extremity of male, lateral view.  $\times 160$ . (Orig.)

dorsally, tail bluntly conical; vulva in the anterior part of the body not far from the termination of the oesophagus. Viviparous. Parasites of the stomach wall of elephants and camels.

Type species: *P. indicum* Baylis, 1921. ♂ 8 mm., ♀ 13 mm. In *Elephas indicus*.

Other species :

*P. africanum* Baylis, 1921. In *Elephas africanus*.

Syn., *Sclerostomum clathratum* (♀) Baird, 1868.

\**P. rhodesiense* n. sp. In African elephant.

*P. skrzabini* Rasowska, 1924. In *Camelus dromedarius*.

*P. smithii* (Cobbold, 1882). In *Elephas indicus*.

Refs. 7, 30, 251, 448, 463a.

Genus **COSMOCEPHALUS** Molin, 1858.

*Definition*.—**ACUARIINÆ**: mouth with two lateral lips each with a small external tooth, and a pair of voluminous papillæ at its base; cephalic region ornamented with four long cordons, greatly recurved and meeting laterally; the cordons bound shield-like areas of raised cuticle; in front of these shields, behind the lips, there is often a cuticular swelling, and behind them prominent cervical papillæ in the form of spines in front of the nerve ring; lateral flanges sometimes present; vestibule very long, cylindrical, and narrow; œsophagus consists of two parts. Male: posterior extremity spirally rolled; caudal alæ present; four pairs of pedunculated preanal papillæ, and four to six pairs of postanal papillæ; spicules very unequal. Female: vulva somewhat behind the middle of the body; uteri opposed. Oviparous, eggs contain larvæ when deposited. Parasites of birds.

Type species: *C. diesingii* Molin, 1858. ♀ 15 mm. In *Larus capistranus*.

Other species :

*C. aduncus* (Creplin, 1846). In *Colymbus* sp., *Larus* spp.

†*C. asturis* n. sp. In *Astur tachino* (from Natal).

\* *Parabronema rhodesiense* n. sp. Length of male 7–8 mm., female 9–10 mm. The distance of the posterior end of the cordons from the anterior extremity varies from 115  $\mu$  in the male to 130–140  $\mu$  in the female; the cordons are longer than in the other species; the length of the vestibule varies from 150  $\mu$  in the male to 175  $\mu$  in the female, and that of the œsophagus from 1,030  $\mu$  in the male to 1,230  $\mu$  in the female. The spicules are about 612 and 330  $\mu$  respectively in length. In the female the distance of the anus from the tip of the tail is about 200  $\mu$ , and the vulva is 860–900  $\mu$  behind the posterior extremity of the œsophagus.

† *Cosmocephalus asturis* n. sp. Length of male 9.5 mm., female 12.5–13.5 mm. The distance of the posterior end of the cordons from the anterior extremity is about 460  $\mu$  in the male and from 550–650  $\mu$  in the female; the length of the vestibule varies from 220  $\mu$  in the male to 360–415  $\mu$  in the female. The first part of the œsophagus varies from 664  $\mu$  in the male to about 730–800  $\mu$  in the female and the second part of the œsophagus from 1,740  $\mu$  in the male to 2,700  $\mu$  in the female. The cervical papillæ are trifid and are situated about 550  $\mu$  in the male and 740  $\mu$  in the female from the anterior extremity. The spicules are about 780 and 220  $\mu$  respectively in length. In the female the distance of the anus from the tip of the tail is about 170–200  $\mu$ ; the vulva is situated about the junction of the middle and posterior thirds of the body.

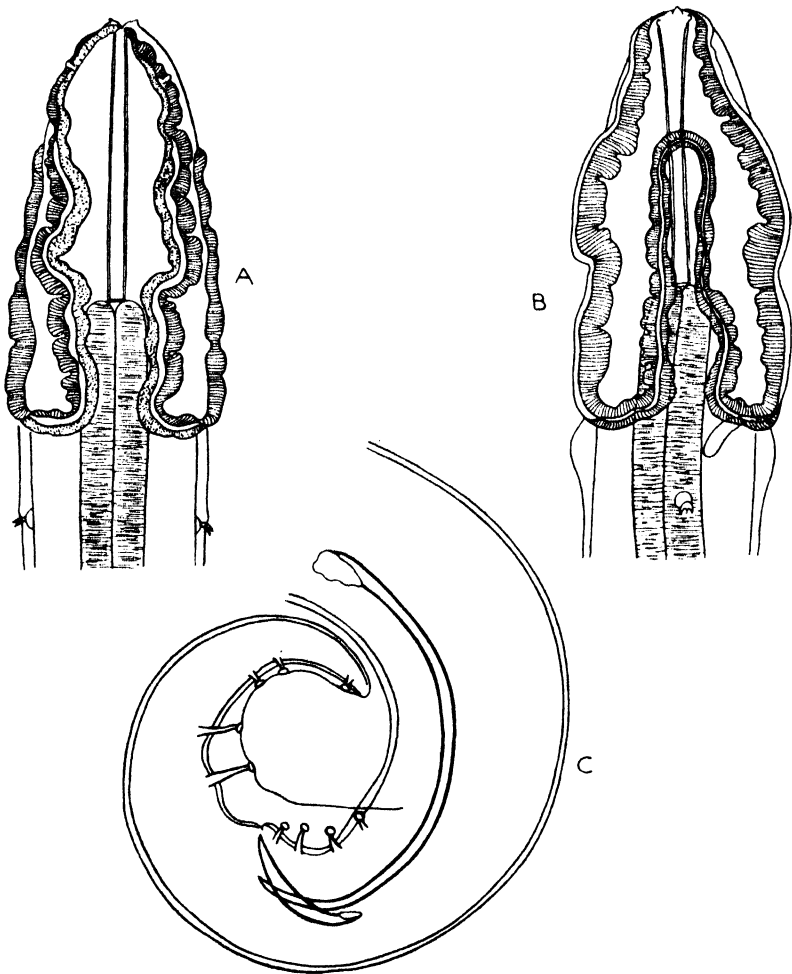


Fig. 232.—*Cosmocephalus asturis*. A. Anterior extremity, ventral view.  $\times 90$ . B. Anterior extremity, lateral view.  $\times 90$ . C. Posterior extremity of male, lateral view.  $\times 90$ . (Orig.)

*C. obvelatus* (Creplin, 1825). In *Larus maximus*.

Syn., *C. alatus* Molin, 1860.

*Histiocephalus spiralis* Diesing, 1851.

*C. papillosus* Molin, 1859.

Refs. 128, 355, 452, 553.

#### FAMILY GNATHOSTOMIDÆ RAILLIET, 1895.

**Definition.**—SPIRUROIDEA : mouth with large distinctly trilobed lateral lips, having the cuticle of their inner surfaces thickened,

and usually raised into longitudinal tooth-like ridges, which meet or interlock with those of the opposite lip; behind the lips is a cuticular head-bulb, provided either with marked transverse striations, or with rows of backwardly directed hooks, and containing four membranous submedian ballonets, the cavity of each of which is in communication with one of four elongated, blind cervical sacs hanging freely in the body cavity. Male: with caudal alæ supported by broad pedunculated papillæ; spicules equal or unequal. Female: vulva in the posterior half of the body; vagina directed forwards, and dividing into two or four uterine tubes. Oviparous, eggs with thin shells, ornamented externally with fine granulations. Parasites of the stomach and intestine, rarely of other parts of the body, of fishes, reptiles, and mammals.

Subfamily GNATHOSTOMINÆ Baylis and Lane, 1920.

*Definition.*—GNATHOSTOMIDÆ: with the characters of the family.

#### KEY TO GENERA.

1. Head-bulb furnished with transverse cuticular ridges having sharp, backwardly projecting edges, but without hooks . . . . . Tanqua, p. 340.  
     Head-bulb armed with transverse rows of recurved hooks . . . . . 2.
2. Body unarmed . . . . . Echinocephalus, p. 342.  
     Body partially or wholly armed with backwardly directed spines . . . . . Gnathostoma, p. 339.

Genus GNATHOSTOMA Owen, 1836.

Syn., *Cheiracanthus* Dies., 1838.

*Definition.*—GNATHOSTOMINÆ: head-bulb armed with simple hooks; the ballonets give no external evidence of their presence; body armed with cuticular spines, anteriorly scale-like with the free edges incised into points varying in number and shape, more posteriorly becoming less subdivided and finally appearing as simple spines, which either continue as such to the posterior end or disappear, leaving the hind part of the body unarmed. Male: spicules unequal; four pairs of large lateral, and two pairs of small ventral caudal papillæ. Female: vulva behind the middle of the body; vagina long; uteri two in number. Oviparous, eggs

with a thin colourless shell, a marked thinning at one pole causing a weak spot through which the embryo escapes. Parasites normally of the gastric wall, usually of carnivorous mammals.

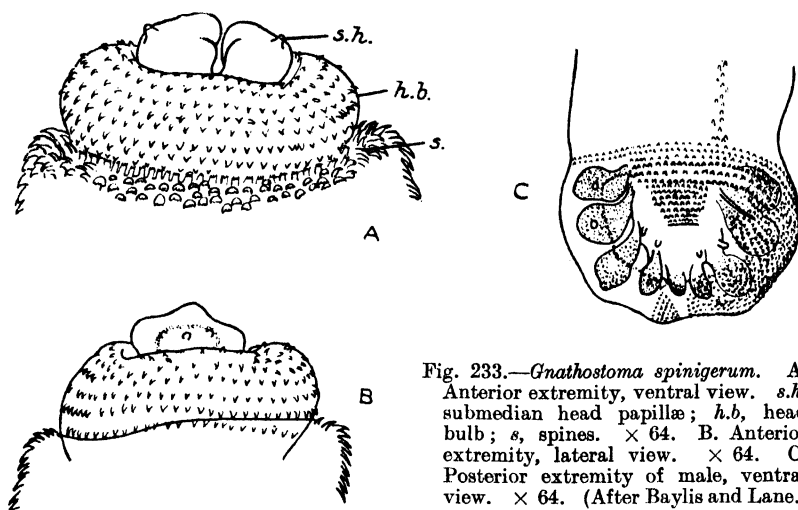


Fig. 233.—*Gnathostoma spinigerum*. A. Anterior extremity, ventral view. *s.h.*, submedian head papillae; *h.b.*, head bulb; *s.*, spines.  $\times 64$ . B. Anterior extremity, lateral view.  $\times 64$ . C. Posterior extremity of male, ventral view.  $\times 64$ . (After Baylis and Lane.)

Type species: *G. spinigerum* Owen, 1836. ♂ 16–18 mm., ♀ 18–25 mm. In stomach of *Felis tigris*, *Felis pardus*, *Canis* sp., *Rattus* sp., and skin of *Homo*.

Syn., *Cheiracanthus robustus* Dies., 1838 [nomen nudum].

*Cheiracanthus siamensis* Levinsen, 1889.

*G. sociale* (Leidy, 1858).

*Filaria radula* Schneider, 1866.

*G. paronai* Porta, 1908.

Other species:

*G. accipitri* Skrjabin, 1916. In *Aquila imperialis*.

*G. gracile* (Dies., 1839). In *Sudis gigas*, etc.

*G. hispidum* Fedtsch., 1872. In *Bos taurus*, pig and man.

*G. horridum* (Leidy, 1856). In *Alligator* sp.

? *G. pelecani* (Chatin, 1874). In *Pelecanus onocrotalus*.

*G. turgidum* Stoss., 1902. In *Didelphys azare*.

Refs. 46, 94, 122, 277, 384, 398, 399, 468, 573, 576.

Genus **TANQUA** Blanchard, 1904.

Syn., *Otenocephalus* Linstow, 1904, preoccupied.

*Tetradenos* Linstow, 1904.

**Definition.**—GNATHOSTOMINÆ: head-bulb coarsely striated transversely, unarmed, divided externally into two or four swellings containing the ballonets; each lip with five teeth, interlocking with those of the other lip; the cuticle behind the head-

bulb forms a more or less pronounced collar or invagination ; body unarmed. Male : caudal alæ well-developed ; eight pairs of papillæ ; spicules equal, tubular, rasp-like, with smooth tips. Female : vulva in the posterior half of the body ; vagina directed forwards ; uterus consists of two opposed branches, or of three anterior, and one posterior, branches. Oviparous, eggs oval, with

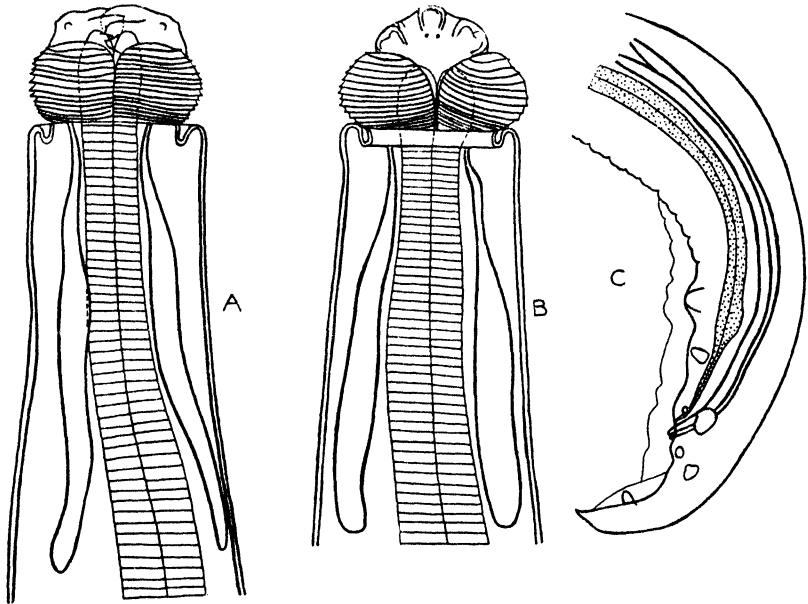


Fig. 234.—*Tanqua tiara*. A. Anterior extremity, ventral view.  $\times 56$ . B. Anterior extremity, lateral view.  $\times 56$ . C. Posterior extremity of male, lateral view.  $\times 56$ . (Orig.)

a thin shell ornamented with fine granulations, embryos not fully formed at the time of deposition. Parasites of stomach of semi-aquatic lizards (*Varanidæ*) and semi-aquatic snakes (*Tropidonotus*, etc.).

Type species : *T. tiara* (Linstow, 1879). ♂ 20–39 mm., ♀ 26–44 mm. In *Varanidæ*.

Syn., *Ascaris tiara* Linstow, 1879.

*Ctenocephalus tiara* (Linstow, 1879) Linstow, 1904.

*Tetradenos tiara* (Linstow, 1879) Linstow, 1904.

Other species :

\* *T. anomala* (Linstow, 1904). In *Tropidonotus piscator*.

Syn., *Heterakis anomala* Linstow, 1904.

\* Travassos (1919) erected the subgenus *Anomala*, presumably for those species of *Tanqua* which have only two uterine tubes : it would therefore contain *T. anomala*



*T. diadema* Baylis, 1916. In *Helicops angulatus*.  
 ? *T. sphærocephala* (Rud., 1809). In *Acipenser sturio*.  
 Refs. 19, 46, 56, 325, 326, 636.

Genus **ECHINOCEPHALUS** Molin, 1858.

Syn., *Cheiracanthus* Linst, 1904, in part, not Dies., 1838.

*Definition*.—GNATHOSTOMINÆ: head-bulb armed with transverse rows of hooks, not externally divided into swellings, but con-

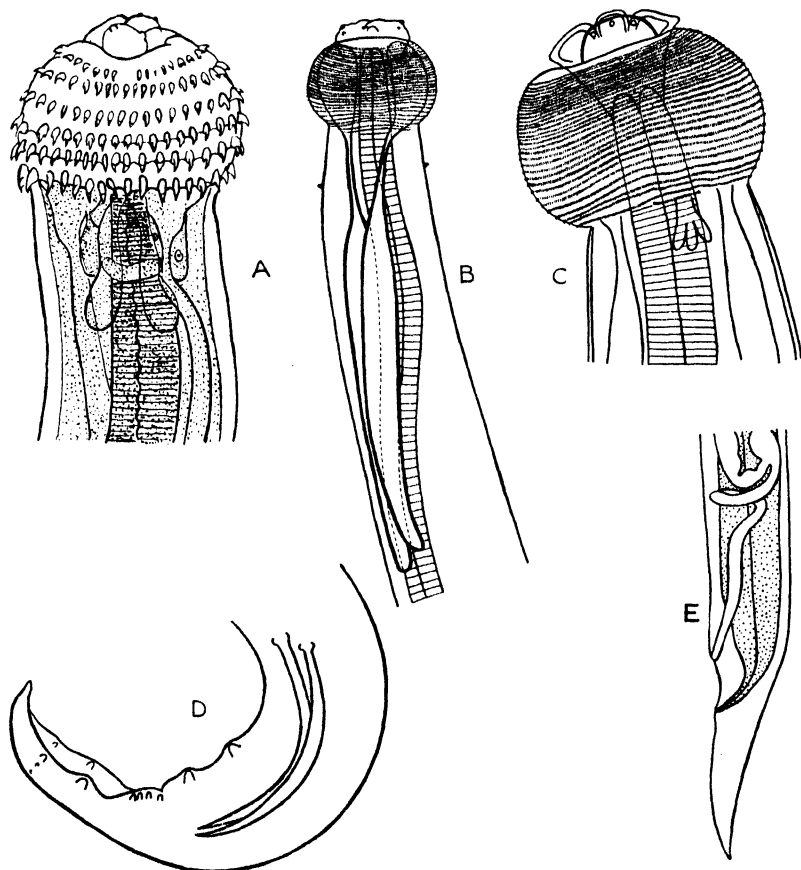


Fig. 235.—*Echinocephalus uncinatus*. A. Anterior extremity, lateral view of larva.  $\times 80$ . (After Baylis and Lane.) *Echinocephalus spinosissimus*. B. Anterior extremity, ventral view.  $\times 35$ . C. Anterior extremity, lateral view.  $\times 72$ . D. Posterior extremity of male, lateral view.  $\times 35$ . E. Posterior extremity of female, lateral view.  $\times 18$ . (Orig.)

and *T. diadema*. It should be pointed out, however, that the name is already pre-occupied, e.g., Samouelle, 1819 (*Coleoptera*), Stephens, 1829 (*Coleoptera*), and Möller, 1832 (*Gastropoda*).

taining four ballonets internally; body unarmed; no cuticular collar behind the head-bulb. Male: with slight caudal alæ; eight pairs of papillæ, the most anterior pair always separated by a long interval from the rest; spicules slightly unequal (left longer than right), tubular, long, slender, and marked with transverse striations. Female: vulva near the posterior end of the body; vagina long and opening into a wide uterine sac which gives off two branches anteriorly. Oviparous, eggs oval, with thin shells ornamented with fine granulations; embryos not fully formed at the time of deposition. Parasites of intestine (usually in spiral valve region) of sting rays and other Elasmobranch fishes.

Type species: *E. uncinatus* Molin, 1858, restr. Baylis and Lane, 1920. Larva 12–14 mm. In rays.

Syn., *Echinocephalus uncinatus* Molin, 1858, in part.

*Cheiracanthus uncinatus* (Molin, 1858) Linstow, 1904.

*Echinocephalus gracilis* Stossich, 1906.

Other species:

*E. multidentatus* Baylis and Lane, 1920. In *Urogymnus asperrimus*.

*E. southwelli* Baylis and Lane, 1920. In *Urogymnus asperrimus*.

*E. spinosissimus* (Linstow, 1905). In *Myliobatis aquila*, *Trygon* spp., etc.

Syn., *Echinocephalus uncinatus* Molin, 1858, in part.

*Cheiracanthus spinosissimus* Linstow, 1905.

*E. striatus* Monticelli, 1889. In *Scyllium* sp.

Refs. 46, 355, 567, 568.

#### FAMILY RICTULARIIDÆ RAILLIET, 1916.

*Definition*.—SPIRUROIDEA: cervical cordons absent; cuticle armed with chitinous hook-like spines arranged in longitudinal rows, or in circles along the whole, or the anterior portion, of the body.

Subfamily RICTULARIINÆ Hall, 1913.

*Definition*.—RICTULARIINÆ: with the characters of the family.

#### KEY TO GENERA.

With two to four longitudinal rows of  
spines . . . . . 1

With a series of circles of spines. . . . . 3

1. With two longitudinal rows of spines on  
each side . . . . . *Pneumonema*, p. 346.

- With longitudinal rows of spines on ventral surface only . . . . . 2
2. Head with four projecting processes :  
 with three longitudinal rows of spines on ventral surface . . . . . Rictularioides, p. 345.
- Head without four projecting processes:  
 with two longitudinal rows of spines on ventral surface . . . . . Rictularia, p. 344.
3. Anterior extremity with a hood-like covering, armed with three circles of very large spines . . . . . Echinonema, p. 347.
- Anterior extremity without hood-like covering . . . . . Spinitectus, p. 348.

Genus **RICTULARIA** Froelich, 1802.

Syn., *Ophiostoma* Rud., 1801, in part.

*Ophiostomum* Creplin, 1839, in part.

*Laphyctes* Duj., 1845 (*Rictularia* renamed).

*Pterygodermatites* Wedl, 1861.

*Definition*.—**RICTULARIINÆ** : buccal capsule well-developed and narrow, with its aperture more or less distinctly dorsal, surrounded by a circle of denticles, and with its base armed with teeth and spines. Along practically the entire ventral surface of each side

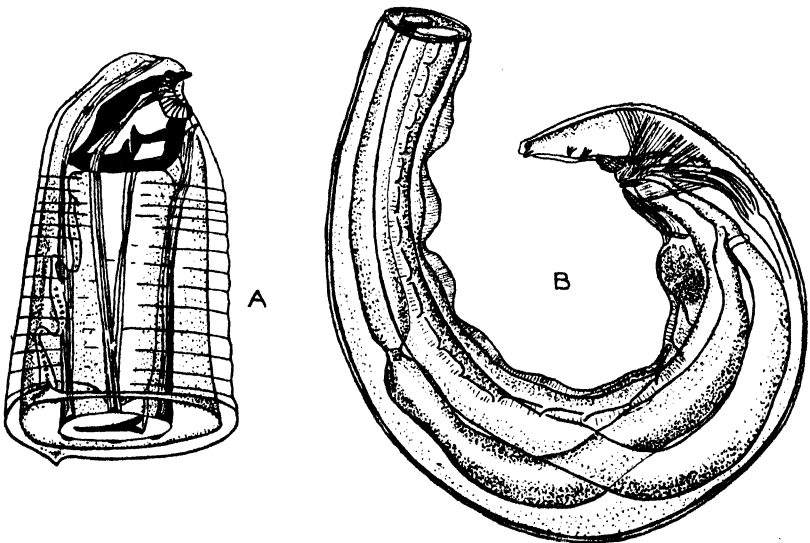


Fig. 236.—*Rictularia affinis*. A. Anterior extremity, lateral view.  $\times 270$ . B. Posterior extremity of male, lateral view.  $\times 63$ . (After Jägerskiöld.)

there are two rows of cuticular combs or spines. Male : tail with or without small alæ ; with pre- and post-anal pedunculated papillæ ; spicules small, and equal or unequal. Female : vulva anterior, near the posterior end of the œsophagus. Oviparous, eggs contain embryos at deposition. Parasites of small intestine of carnivora, rodents, and ? lizards.

Type species : *R. cristata* Froelich, 1802. ♂ unknown, ♀ 22-27 mm. In *Mus sylvaticus*.

Syn., *Ophiostoma cristatum* (Froelich, 1802) Rud., 1819.

Other species :

*R. affinis* Jaegerskiöld, 1904. In *Vulpes niloticus*.

*R. bovieri* R. Blanchard, 1886. In *Vespertilio murinus*.

*R. cahirensis* Jaegerskiöld, 1904. In cat and dog.

*R. coloradensis* Hall, 1916. In *Eutamias quadrivittatus*.

*R. disparalis* Irwin-Smith, 1922. In *Hinulia* sp.

*R. elviræ* Parona, 1889. In *Sciurus* sp., *Dremomys* sp.

*R. fallax* Jaegerskiöld, 1909. In *Sciurus melanogaster*.

Syn., *R. plagiostoma* Parona, 1889, not Wedl, 1861.

*R. macdonaldi* (Dobson, 1880). In *Megaderma frons*.

*R. plagiostoma* (Wedl, 1861). In *Vespertilio mystacinus*.

Syn., *Pterygodermatites plagiostoma* Wedl, 1861.

*Ophiostoma spinosum* Will.-Suhm, 1869.

*R. proni* Seurat, 1915. In *Herpestes* sp.

*R. splendida* Hall, 1913. In *Canis nebracensis*.

Refs. 114, 128, 131, 139, 174, 204, 205, 242, 243, 347b, 521, 664.

Genus **RICTULARIOIDES** Hall, 1916.

*Definition*.—**RICTULARIINÆ** : head with four projecting apices united by chitinous membranes to form two equal lips. Male : unknown. Female : with three series of simple posteriorly directed hooks along the body.

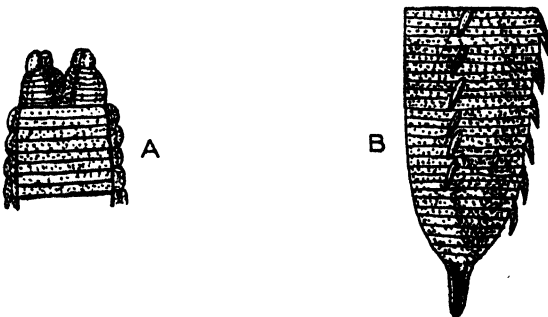


Fig. 237.—*Rictularioides amphiacanthum*. A. Anterior extremity. B. Posterior extremity of female. (After Diesing.)

Type species : *R. amphiacanthum* (Dies., 1851). ♂ ?, ♀ 8–11.5 mm. In *Oxymycterus rufus*.

Syn., *Ophiostomum amphiacanthum* Dies., 1851.

*Rictularia amphiacantha* (Dies., 1851) Drasche, 1882.

Refs. 123, 128, 205.

Genus **PNEUMONEMA** Johnston, 1916.

*Definition*.—**RICTULARIINÆ**: anterior extremity bent slightly dorsally; mouth with two small trilobed lateral lips; mouth

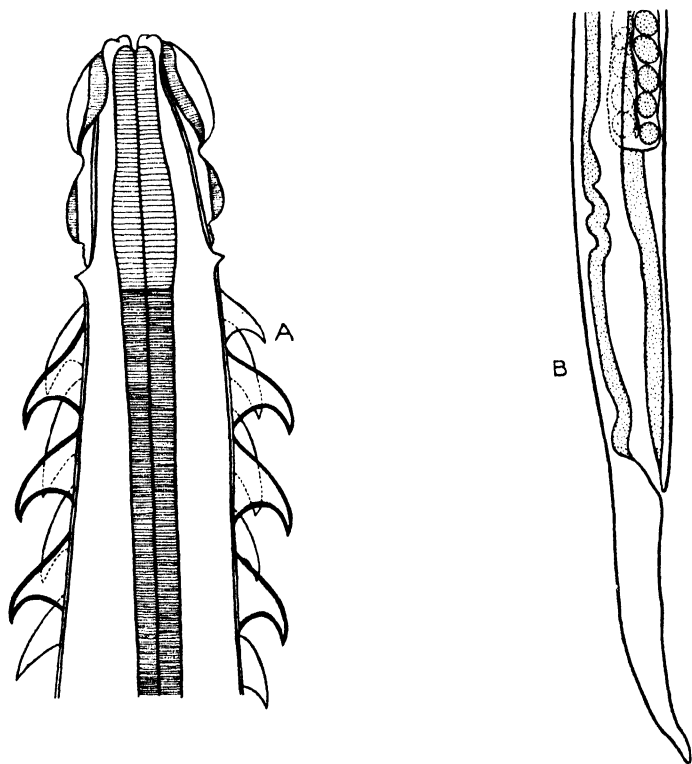


Fig. 238.—*Pneumonema tiliquæ*. A. Anterior extremity, ventral view.  $\times 215$ .  
B. Posterior extremity of female, lateral view.  $\times 75$ . (Orig.)

cavity very small; vestibule absent, the œsophagus reaching nearly to the anterior extremity; two cervical alæ on each side, the anterior being more heavily chitinized than the posterior; behind these alæ are two longitudinal rows of large thorn-like spines on each side, becoming gradually smaller posteriorly, and disappearing about the junction of the anterior and middle thirds of the worm;

the cervical papillæ lie just behind the more posterior of the cervical alæ; œsophagus cylindrical and divided into two parts, of which the anterior muscular portion is the shorter. Male: unknown. Female: posterior extremity long and pointed; vulva near the middle of the body; uteri opposed. Oviparous, eggs with thin shells, containing a larva when deposited. Parasites of the lung of reptiles.

Type species: *P. tiliquæ* Johnston, 1916. ♂?, ♀ 6–9 mm. In *Tiliqua scincoides*.

Refs. 74, 246.

Genus **ECHINONEMA** Linstow, 1898.

Syn., *Hoplocephalus* Linstow, 1898, preoccupied.

*Definition*.—**RICTULARIINÆ**: mouth opens subterminally, with two small lateral lips; mouth cavity very small, œsophagus

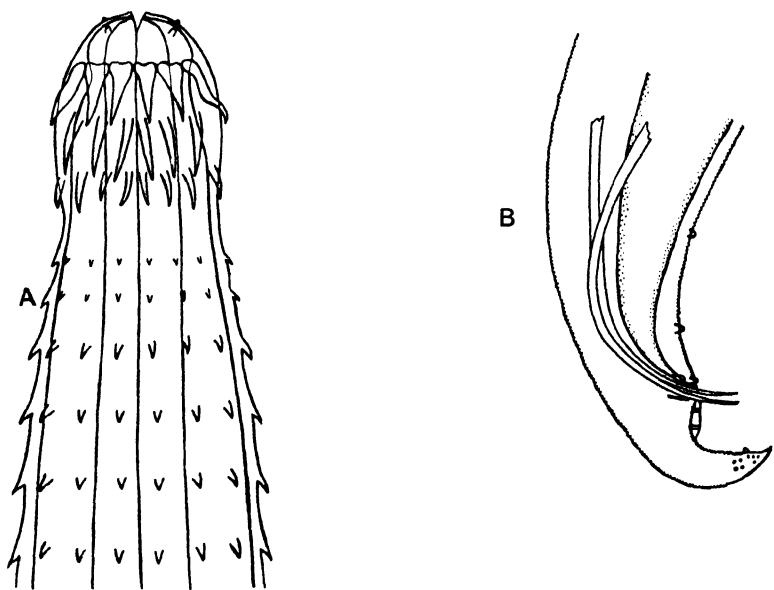


Fig. 239.—*Echinonema cincta*. A. Anterior extremity, ventral view.  $\times 56$ .  
B. Posterior extremity of male, lateral view.  $\times 56$ . (Orig.)

reaching nearly to the anterior end; cephalic cuticle somewhat dilated, and ornamented with three circles of very large posteriorly directed spines; cuticle of anterior portion of worm also provided with circles of spines, which become extremely minute after the first twelve or thirteen circles, each circle consists of about fourteen to sixteen spines arranged in such a manner

that the spines are in longitudinal rows ; œsophagus relatively short and not clearly divided into two portions. Male : posterior extremity short, conical, and ending in a short sharp point ; caudal alæ absent, with a row of three preanal and three postanal papillæ subventrally on each side, and more laterally a large papilla about the level of the cloaca ; there is also a group of very small papillæ near the tip of the tail ; spicules equal, with simple points ; gubernaculum present. Female : posterior extremity sharply conical ; vulva about the junction of the anterior and middle thirds of the body. Oviparous, eggs with a thick shell, containing an embryo when deposited.

Type species : *E. cincta* Linstow, 1898. ♂ 14–16 mm., ♀ 30–32 mm. In *Perameles obesula*.

Syn., *Hoplocephalus cinctus* Linstow, 1898.

Refs. 316, 316a.

Genus **SPINITECTUS** Fourment, 1883.

Syn., \**Liorhynchus* Rud., 1801, in part.

*Goezia* Zeder, 1800, in part.

*Definition*.—**RICTULARIINÆ** : mouth with indistinct lips ; cuticle provided with a series of transverse rings to the hinder edge of which are attached backwardly directed spines, which gradually

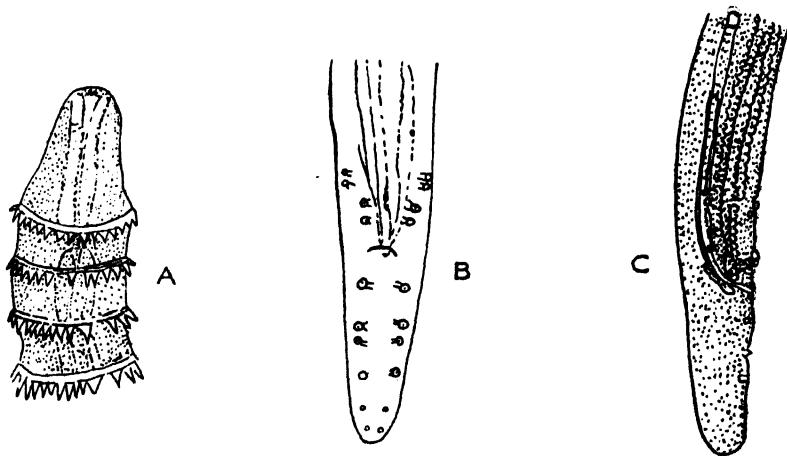


Fig. 240.—*Spinitectus cristatus*. A. Anterior extremity.  $\times 300$ . B. Posterior extremity of male, ventral view.  $\times 240$ . C. Posterior extremity of male, semi-lateral view.  $\times 240$ . (After Linton.)

\* According to Schneider, Stiles and Hassall, and Railliet, the genus *Liorhynchus* Rud., 1801, has for its type an undeterminable species *L. truncatus* (Rud., 1873) and should therefore be abandoned.

diminish in size and number posteriorly ; vestibule cylindrical or funnel-shaped ; œsophagus consists of two parts—muscular and glandular. Male : tail spiral ; caudal alæ narrow ; sometimes with denticulated crests in front of the cloaca ; papillæ apparently present or absent (Linton states, that in *S. cristatus* there are four pairs of preanal and five or six pairs of postanal papillæ, and Ward and Magath state, that in *S. gracilis* papillæ are absent). Female : tail almost straight ; vulva in the posterior part of the body. Oviparous, eggs small, ellipsoidal with a thick shell, and sometimes with polar plugs bearing long filaments. Parasites of stomach and intestine of fishes.

Type species : *S. oviflagellis* Fourment, 1883. ♂ ?, ♀ 12 mm. In *Merlangus vulgaris*.

Other species :

*S. cristatus* Railliet and Henry, 1915. In *Phycis tenuis*.

Syn., *Filaria serrata* Linton, 1901, not 1892.

*S. echinatus* (Linstow, 1878). [Probably larval form of *S. inermis*]. In *Alburnus lucidus*.

*S. gracilis* Ward and Magath, 1916. In fresh-water fishes—black crappie, white bass, etc.

*S. inermis* (Zeder, 1800). In eels.

Syn., *Gæzia inermis* Zeder, 1800.

*Liorhynchus denticulatus* Rud., 1809.

Refs. 131, 136, 137, 334, 442, 476, 480, 662.

#### FAMILY SEURATIDÆ RAILLIET, 1916.

*Definition*.—SPIRUROIDEA : mouth bounded by two lateral lips ; without a vestibule ; œsophagus very short, club-shaped, and entirely muscular ; cervical papillæ symmetrical and behind the nerve ring ; cuticle with fine transverse striations and sixty-four longitudinal dark bands.

Subfamily SEURATINÆ Hall, 1916.

*Definition*.—SEURATIDÆ : with the characters of the family.

Genus SEURATUM\* Hall, 1916.

Syn., *Ophiostomum* Creplin, 1839, of Seurat, 1915.

*Definition*.—SEURATINÆ : mouth elongate dorso-ventrally, bounded by two lateral lips, each with two large papillæ ; buccal cavity very short ; vestibule absent ; lateral cuticular flanges

\* Baylis (1923) considers that the genus *Seuratum* belongs to the family *Cucullanidæ*.



absent ; cuticle with fine transverse striations and sixty-four longitudinal dark straight bands, presenting in the line of each band a dentiform thickening of the transverse striations, with the point directed posteriorly : œsophagus very short, club-shaped, entirely muscular, and not divided into two parts ; cervical papillæ behind the nerve ring. Male : tail short and conical ; caudal alæ narrow ; with four pairs of large sessile preanal papillæ, and six pairs of

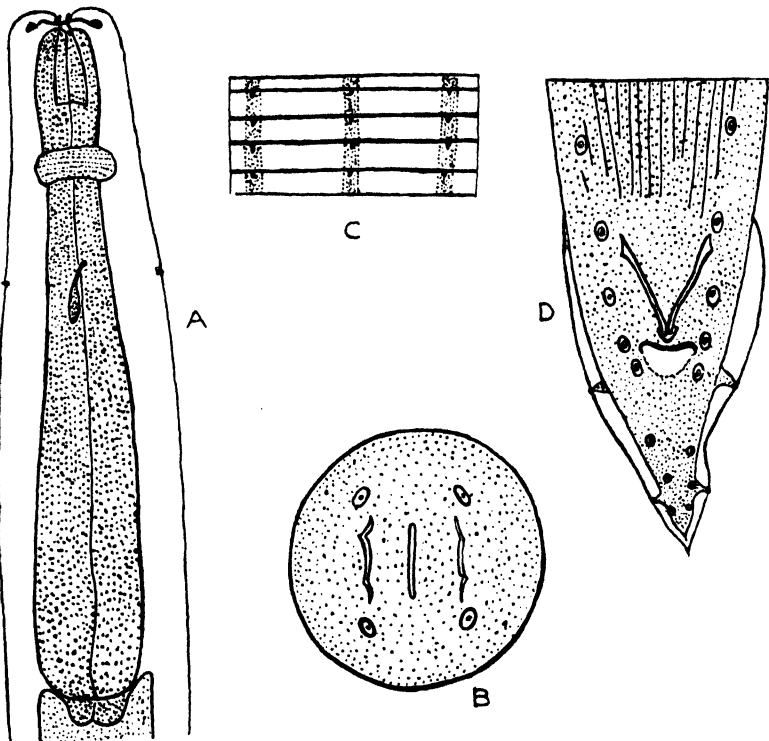


Fig. 241.—*Seuratium tacapense*. A. Anterior extremity, ventral view.  $\times 66$ . B. Anterior extremity, end-on view.  $\times 100$ . C. Portion of cuticle showing bands. D. Posterior extremity of male, ventral view.  $\times 100$ . (After Seurat.)

postanal papillæ, of which the second and fifth are large and pedunculated ; spicules short and about equal ; gubernaculum present. For a short distance in front of the cloaca the ventral surface is covered with about twenty longitudinal cuticular shields, which become confluent a little in front of the cloaca. Female : vulva slightly in front of the middle of the body ; uteri opposed. Oviparous, eggs large, subspherical, and containing an embryo when deposited. Parasites of rodents.

Type species : *S. tacapense* (Seurat, 1915). ♂ 18.5–22.5 mm., ♀ 45 mm. In *Ctenodactylus gundi*.

Syn., *Ophistomum tacapense* Seurat, 1915.

Refs. 34, 205, 405, 517, 556.

#### FAMILY PHYSALOPTERIDÆ LEIPER, 1908.

*Definition*.—SPIRUROIDEA : mouth with large simple triangular lateral lips armed with one or more teeth ; cuticle reflected forwards over the lips to form a cephalic collarette ; cutaneous cordons or epaulettes absent ; usually without a vestibule ; œsophagus divided into two portions. Male : caudal alæ well-developed, usually meeting ventrally in front of the cloaca, and supported by long costiform papillæ.

#### Subfamily PHYSALOPTERINÆ Railliet, 1893.

*Definition*.—PHYSALOPTERIDÆ : with the characters of the family.

#### KEY TO GENERA.

1. Cervical papillæ modified into large crescentic tooth-like structures . . . . . Streptocara, p. 359.  
Cervical papillæ simple . . . . . 2
2. Without a cephalic collarette ; vestibule present . . . . . Thubunæa, p. 358.  
With a cephalic collarette ; vestibule absent . . . . . 3
3. Male with caudal alæ not meeting ventrally in front of cloaca ; vulva near anus . . . . . Proleptus, p. 357.  
Male with caudal alæ meeting ventrally in front of cloaca ; vulva in front of middle of body . . . . . 4
4. With a prepuce-like sheath over the posterior end of body . . . . . Chlamydonema, p. 356.  
Without a prepuce-like sheath over the posterior end of body . . . . . Physaloptera, p. 351.

#### Genus PHYSALOPTERA Rud., 1819.

*Definition*.—PHYSALOPTERINÆ : with two large, simple, triangular, lateral lips, each armed with a variable number of teeth and with two external papillæ ; cuticle generally reflected over the lips to form a large cephalic collarette ; cervical papillæ

behind the nerve ring ; with a short buccal cavity, but without a definite vestibule ; œsophagus consists of an anterior muscular, and a posterior glandular part. Male : with caudal alæ meeting ventrally in front of the anus, at least four pairs of costiform papillæ, supporting the alæ and surrounding the cloaca, and a variable number of sessile papillæ, of which three are generally preanal and five postanal ; spicules unequal, subequal, or equal. Female : vulva in front of the middle of the body ; uterus with two (didelphys), or four (tetradelphys), or more (polydelphys)

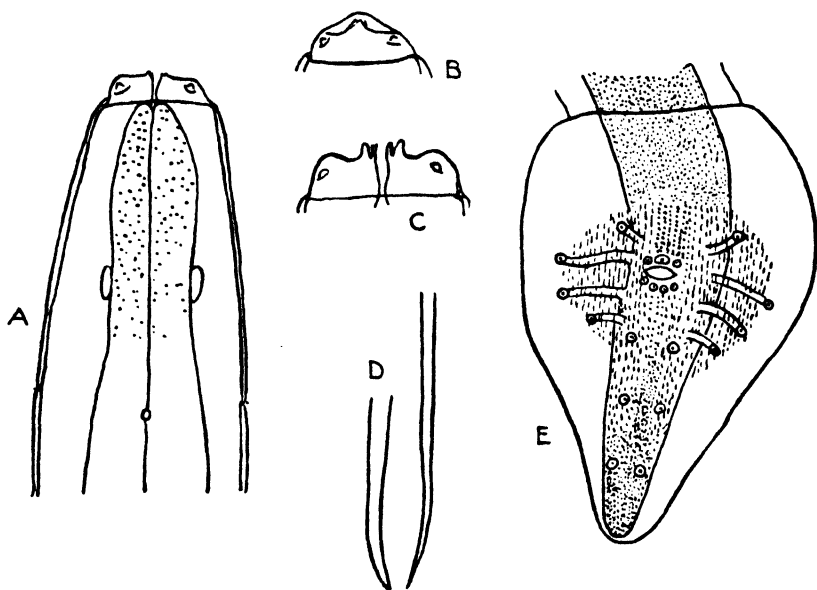


Fig. 242.—*Physaloptera clausa*. A. Anterior extremity, ventral view.  $\times 50$ . B. Head, lateral view. C. Head, ventral view. D. Spicules.  $\times 50$ . E. Posterior extremity of male, ventral view.  $\times 32$ . (After Ortlepp.)

branches. Oviparous, eggs oval, smooth, thick-shelled, and embryonated when deposited. Parasites in the stomach and intestine of mammals, birds, reptiles, and very rarely amphibia.

Type species : *P. clausa* Rudolphi, 1819. ♂ 15–28 mm., ♀ 30–50 mm. In *Erinaceus europæus*.

Other species :

*P. abbreviata* Rud., 1819. In *Lacerta* spp., etc.

? *P. abjecta* Leidy, 1856. In *Psammophis flagelliformis*.

*P. acuticauda* Molin, 1860. In *Falco atricapillus*, etc.

*P. africana* (Monnig, 1924). In *Paraxerus* sp., *Otomys* sp., *Mus* spp.

Syn., *Leptosoma africana* Monnig, 1924.

- P. alata* Rud., 1819. In *Falco* spp.  
 Syn., *Spiroptera physalura* Duj., 1845.  
*P. alata* var. *chevreuxi* Seurat, 1914. In hawk.  
*P. alata* var. *nouveli* Seurat, 1915. In *Aquila* sp., *Accipiter* sp.  
*P. aloisii-sabaudiae* Parona, 1907. In *Agama atricollis*.  
*P. amphibia* v. Linstow, 1899. In *Rana macrodon*.  
*P. anomala* Molin, 1860. In *Felis onça*.  
*P. antarctica* v. Linstow, 1899. In *Acanthophis antarctica*,  
*Cyclodus* spp.  
 Syn., *P. alba* Stoss., 1902.  
*P. antarctica* var. *antarctica* Irwin-Smith, 1922. In *Tiliqua* spp.  
*P. antarctica* var. *lata* Irwin-Smith, 1922. In *Tiliqua* spp.  
*P. bilabiata* Creplin, 1829. In *Lanius minor*.  
*P. bonnei* Ortlepp, 1922. In "Sapakara."  
*P. brevicauda* v. Linstow, 1906. In *Francolinus adspersus*.  
*P. brevispiculum* v. Linstow, 1906. In *Felis rubiginosa*.  
*P. brevivaginata* Seurat, 1917. In *Vespertilio kuehli*.  
*P. britanica* Skrjabin, 1916. In *Agama* sp.  
*P. capensis* Ortlepp, 1922. In *Xerus setosus*.  
*P. caucasica* v. Linstow, 1902. In *Homo sapiens*.  
*P. cebi* Ortlepp, 1923. In *Cebus fatuellus*.  
*P. cesticillata* Sonsino, 1889. In *Canis cerdo*, *Fennecus* sp.  
*P. chamæleontis* Geddoelst, 1916. In *Chamæleon gracilis*.  
 Syn., *P. leptosoma* (Gervais) Seurat, 1917.  
*P. circularis* v. Linstow, 1897. In *Mus rattus*.  
*P. citilli* (Rud., 1819) Hall, 1916. In *Citellus citellus*.  
 Syn., *Spiroptera citilli* Rud., 1819.  
*P. cœlebs* v. Linstow, 1897. In *Centetes ecaudatus*.  
*P. colubri* (Rud., 1819) Dies., 1851. In *Coronella austriaca*.  
*P. crassa* v. Linstow, 1879. In *Alauda arvensis*.  
*P. croisi* Seurat, 1914. In *Accipiter nisus*.  
*P. dentata* v. Linstow, 1883. In *Agama* sp., *Vipera* sp.  
*P. digitata* Schneider, 1866. In *Felis concolor*.  
*P. dilatata* Rud., 1819. In *Lagothrix humboldtii*, etc.  
 Syn., *Spiroptera dilatata* (Rud., 1819) Duj., 1845.  
*P. dispar* v. Linstow, 1904. In *Erinaceus albiventris*.  
*P. elegantissima* Stossich, 1902. In *Ratelus capensis*.  
*P. formosana* Yokogawa, 1922. In *Sorex* sp.  
*P. fusiformis* v. Linstow, 1902. In *Micropogon* sp.  
*P. galinieri* Seurat, 1914. In eagle.  
*P. gemina* v. Linstow, 1899. In *Felis catus domesticus*.

- P. getula* Seurat, 1917. In *Mus rattus*.  
*P. gracilis* Ortlepp, 1922. In lizards.  
*P. guarti* Garin, 1913. In *Leptonychotes weddelli*.  
*P. incurva* v. Linstow, 1908. In *Erinaceus frontalis*.  
*P. inermis* v. Linstow, 1906. In *Sciurus prevosti*.  
*P. inflata* (Molin, 1860). In *Falco unicinctus*.  
*P. leiperi* Skrjabin, 1924. In *Spermophilopsis leptodactylus*.  
*P. limbata* Leidy, 1856. In *Scalops canadensis*.  
*P. longissima* Ortlepp, 1922. In snakes.  
*P. magnipapilla* Molin, 1860. In *Myrmecophaga bivittata*.  
? *P. malleus* v. Linstow, 1883. In *Corvus cornix*.  
*P. maxillaris* Molin, 1860. In *Mephitis chinche*.  
*P. megalostoma* Creplin, 1829. In *Falco nisus*.  
Syn., *P. alata* Rud., 1819, of Stoss., 1889.  
*P. mephites* Solanet, 1909. In *Mephitis suffocans*.  
*P. monodens* Molin, 1860. In *Boa constrictor*. -  
*P. mordens* Leiper, 1908. In *Homo sapiens*, monkeys.  
*P. muris-brasiliensis* Diesing, 1861. In *Mus brasiliensis*.  
Syn., *Spiroptera bilabiata* Molin, 1860 not *Spiroptera bilabiata* (Crep., 1829) Duj., 1845.  
*P. nasilionis* Gedoelst, 1916. In *Nasilio brachyrhynchus*.  
*P. numidica* Seurat, 1917. In *Dipodillus campestris*.  
*P. obtusissima* Molin, 1860. In *Bothrops* sp., *Cloelia* spp., *Ophis* spp., etc.  
*P. pallaryi* Seurat, 1917. In *Agama bibrioni*.  
? *P. papilloradiata* v. Linstow, 1899. In *Canis lupus*.  
*P. papillotruncata* Molin, 1860. In *Myrmecophaga jubata*.  
*P. paradoxa* v. Linstow, 1908. In *Varanus albigularis*, *Psammophis sibilans*, etc.  
Syn., *P. affinis* Gedoelst, 1916.  
*P. phrynosoma* Ortlepp, 1922. In *Phrynosoma cornutum*.  
*P. physignathi* Baylis, 1924. In *Physignathus* sp.  
*P. pyramidalis* v. Linstow, 1879. In *Cholepus didactylus*.  
*P. quadrovaria* Leiper, 1908. In *Varanus niloticus*.  
*P. rara* Hall and Wigdor, 1918. In *Canis familiaris*.  
*P. retusa* Rud., 1819. In *Tupinambis teguixin*, etc.  
Syn., *Spiroptera retusa* (Rud., 1819) Duj., 1845.  
*P. ruwenzorii* Parona, 1907. In *Arvicanthus* sp., *Mus* sp.  
*P. sciuri* Parona, 1898. In *Sciurus melanogaster*.  
*P. semilanceolata* Molin, 1860. In *Nasua narica*.  
*P. simplicidens* Ortlepp, 1922. In lizard.  
*P. sonsinoi* v. Linstow, 1895. In *Agama mutabilis*.  
*P. spiralis* Schneider, 1866. In *Amphisbæna* sp.

? *P. spirula* Hempr. and Ehrenb., 1828. In *Procavia* spp.

*P. subalata* Schneider, 1866. In *Falco* sp.

*P. tacapensis* Seurat, 1917. In *Ctenodactylus gundi*.

*P. terdentata* Molin, 1860. In *Felis concolor*.

*P. torquata* Leidy, 1856. In *Meles labradorica*.

*P. torresi* (Travassos, 1920). In *Agouti paca*.

Syn., *Turgida torresi* Travassos, 1920.

*P. truncata* Schneider, 1866. In *Phasianus gallus*.

*P. turgida* Rudolphi, 1819. In *Didelphys* spp.

Syn., *Turgida turgida* (Rud., 1819) Travassos, 1920.

*Spiroptera turgida* (Rud., 1819) Duj., 1845.

*P. vandenbrandeni* Geddoelst, 1924. In a wild cat.

*P. varani* Parona, 1889. In *Varanus* sp.

Travassos (1919 and 1920) has divided the genus *Physaloptera* as follows :—

1. Spicules similar and subequal.

A. Two uteri.

- a. Four pairs of pedunculated papillæ ; no prepuce-like sheath at posterior end.

*Physaloptera* s.s. Travassos, 1919.

With a prepuce-like sheath at posterior end.

*Chlamydonema* Hegt, 1910.

- b. Eight pairs of pedunculated papillæ.

*Thubunæa* Seurat, 1914.

B. Ten uteri . . . . . *Turgida* Travassos, 1919.

2. Spicules dissimilar and very unequal.

AA. Two uteri.

- aa. Four pairs of pedunculated papillæ.

*Abbreviata* Travassos, 1919.

- bb. Ten pairs of pedunculated papillæ.

- cc. Vulva in anterior half of body, ovejector very long . . . . . *Heliconema* Travassos, 1919.

- dd. Vulva near anus, ovejector short.

*Proleptus* Duj., 1845.

BB. Four uteri . . . . . *Leptosoma* Travassos, 1919.

The type species are presumably as follows :—

*Physaloptera* : *P. clausa* Rud., 1819 ; *Chlamydonema* : *C. felineum* Hegt, 1910 = *P. præputialis* Linst., 1899 ; *Thubunæa* : *T. pudica* Seurat, 1914 ; *Turgida* : *T. turgida* (Rud., 1819) ; *Abbreviata* : *A. abbreviata* (Rud., 1819) ; *Heliconema* : type not mentioned ; *Proleptus* : *P. acutus* Duj., 1845 ; *Leptosoma* : *L. leptosoma* (Gervais, of Seurat, 1917).

A good deal of this classification is, as Ortlepp (1922) has pointed out, very unsatisfactory. *Leptosoma* is preoccupied and *P. leptosoma* has only two uteri, according to Seurat (1917); *P. abbreviata* Rud., 1819, has four uteri, according to Seurat (1914); and certain of the *Physaloptera* which have a prepuce-like sheath have four uteri.

Refs. 41, 160a, 239, 240, 241, 275, 378, 379, 477, 502, 516, 536, 538, 582a, 635, 638, 668a.

Genus **CHLAMYDONEMA** Hegt, 1910.

*Definition*.—**PHYSALOPTERINÆ**: closely resembles *Physaloptera*, but differs in possessing a prepuce-like sheath over the posterior extremity. Parasites of carnivora and monkeys.

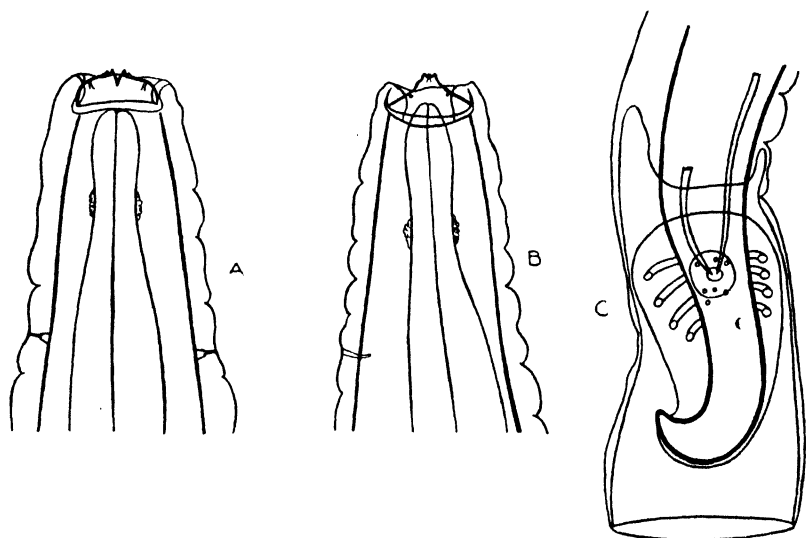


Fig. 243.—*Chlamydonema præputiale*. A. Anterior extremity, ventral view.  $\times 40$ . B. Anterior extremity, lateral view.  $\times 40$ . C. Posterior extremity of male, ventral view.  $\times 40$ . (Orig.)

Type species: *C. præputiale* (Linstow, 1889). ♂ 13–40 mm., ♀ 15–48 mm. In *Felis* spp.

Syn., *Physaloptera præputialis* Linstow, 1889.

*Chlamydonema felineum* Hegt, 1910.

Other species:

*C. malayense* (Ortlepp, 1922). In *Felis* spp.

*C. tumefaciens* (Henry and Blanc, 1912). In *Macacus* spp.

Refs. 212, 214, 315a, 378.

Genus **PROLEPTUS** Duj., 1845.

Syn., *Coronilla* Beneden, 1871.

*Spiropterina* Beneden, 1858.

*Definition.*—**PHYSALOPTERINÆ**: mouth bounded by two simple lateral lips, each bearing a truncated tooth, and two submedian papillæ; cephalic collarette present; cervical papillæ sym-

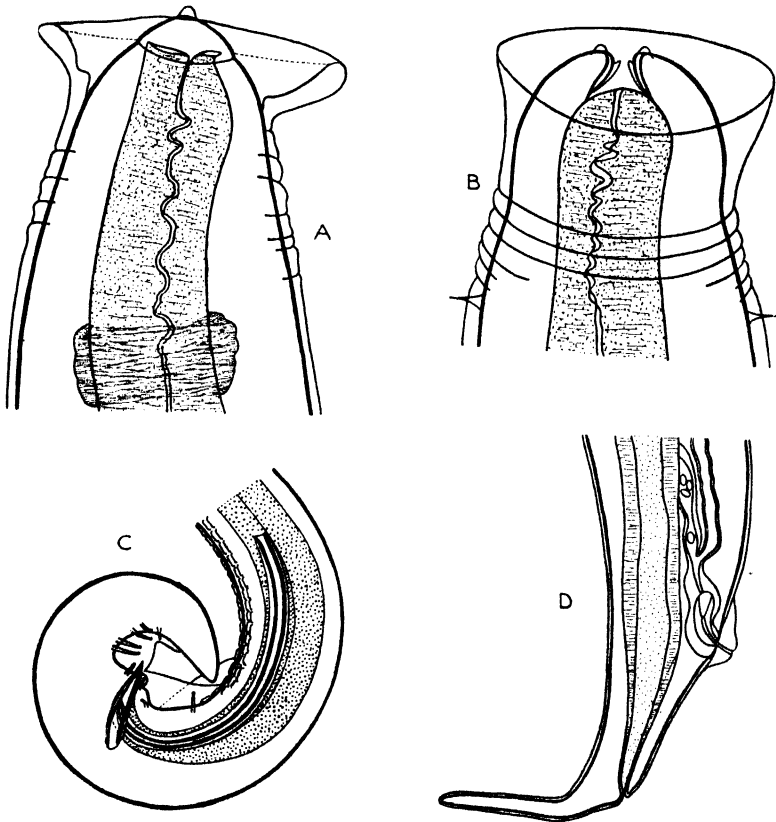


Fig. 244.—*Proleptus obtusus*. A. Anterior extremity, lateral view.  $\times 160$ . B. Anterior extremity, ventral view.  $\times 160$ . C. Posterior extremity of male, lateral view.  $\times 35$ . D. Posterior extremity of female, lateral view.  $\times 35$ . (Orig.)

metrical, in front of the nerve ring; excretory pore some distance posterior to it; œsophagus clearly divided into two parts, anterior muscular and posterior glandular. Male: posterior extremity spirally coiled; with large caudal alæ; with nine pairs of symmetrical pedunculated papillæ, of which three are pre- or ad-anal



and six postanal, and, in addition, an unpaired sessile papilla on the anterior lip of the cloaca, and a pair of short pedunculated papillæ immediately behind the cloaca; spicules very unequal; gubernaculum absent. Female: vulva projecting, near the anus; uteri parallel; ovejector short; oviducts and ovaries intertwined in the posterior part of the body. Oviparous, eggs small, with a thick shell, containing a larva at deposition. Parasites of stomach and intestines of Selachians, and tortoises.

Type species: *P. acutus* Duj., 1845. ♂ 12 mm., ♀? In *Raja clavata*.

Syn., *Spiroptera dacnodes* Creplin, 1851.

*Spiropterina dacnodes* (Creplin, 1851) Oerley, 1885.

*Histiocephalus dacnodes* (Creplin, 1851) Molin, 1860.

Other species:

*P. coronatus* (Beneden, 1858). In *Raja* sp., *Scyllium* sp.

Syn., *Spiropterina coronata* Bened., 1858.

*P. elegans* (Oerley, 1885). In *Hexanchus* sp.

*P. gordioides* Beneden, 1858. In *Galeus canis*.

*P. obtusus* Duj., 1845. In *Scyllium catulus*.

Syn., *Coronilla scillicola* Beneden, 1871.

*Spiropterina scillicola* (Beneden, 1871) Linstow, 1901.

*P. rajæ* (Dies., 1851). In *Raja clavata*.

*P. robustus* (Beneden, 1871). In *Raja circularis*.

Syn., *Coronilla robusta* Beneden, 1871.

*P. tortus* Linstow, 1906. In *Cistudo ornata*.

Refs. 48, 50, 131, 554.

#### Genus THUBUNÆA Seurat, 1914.

*Definition*.—PHYSALOPTERINÆ: mouth with two lateral rounded simple lips, the internal surfaces of which are armed with three prominent teeth, and which bear a pair of submedian papillæ; lateral flanges absent; cervical papillæ immediately behind the nerve ring; vestibule short, cylindrical, compressed laterally, and with delicate walls; œsophagus short with an anterior muscular and a posterior glandular part. Male: posterior extremity rounded terminating in a small conical process; caudal alæ well-developed exhibiting a verrucose appearance; four pairs of pedunculated preanal papillæ and four or five pairs of pedunculated postanal papillæ, and, in addition, about a dozen sessile papillæ round the anus; spicules equal. Female: posterior extremity short, terminating in a small conical point; vulva in the anterior fifth of the body; ovejector long; uteri parallel.

Oviparous, eggs with a thick shell, containing larvæ when deposited. Parasites of reptiles.

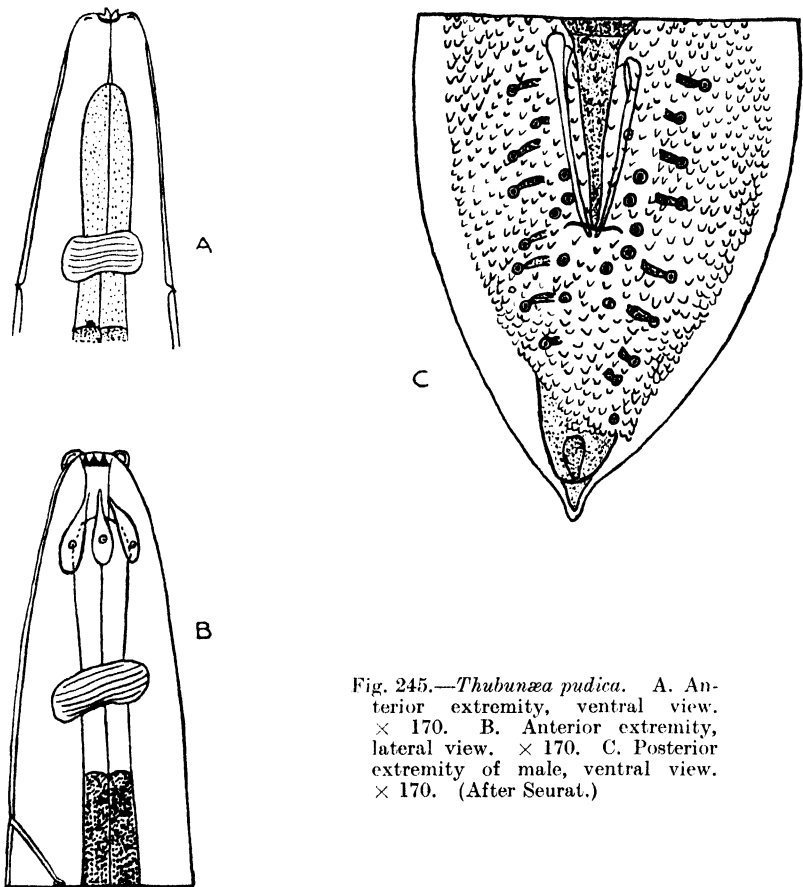


Fig. 245.—*Thubunæa pudica*. A. Anterior extremity, ventral view.  $\times 170$ . B. Anterior extremity, lateral view.  $\times 170$ . C. Posterior extremity of male, ventral view.  $\times 170$ . (After Seurat.)

Type species : *T. pudica* Seurat, 1914. ♂ 8 mm., ♀ 9–19 mm. In chameleon.

Refs. 378, 505, 638.

Genus **STREPTOCARA** Railliet, Henry, and Sisoff, 1912.

Syn., *Yseria* Geddoelst, 1919.

*Definition*.—**PHYSALOPTERINÆ** : head with two simple lateral lips, each bearing a dentiform process and two small lateral papillæ ; behind the lips is a collarete, with a dentate anterior margin ; the cervical papillæ are represented by large crescentic structures with five or six small teeth on the posterior concave

surface; behind the buccal cavity is a short vestibule with delicate walls; œsophagus long and cylindrical. Male: posterior extremity conical, blunt, and spirally coiled; caudal alæ present; four pairs of costiform preanal and five or six pairs of costiform postanal papillæ; spicules very unequal. Female: posterior extremity rounded; anus subterminal; vulva a little behind the middle of the body. Oviparous, eggs elliptical with a thin shell, containing an embryo at deposition. Parasites of the gizzard of birds.

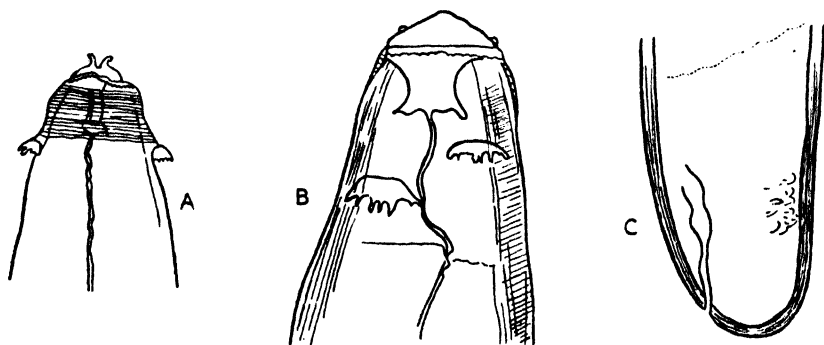


Fig. 246.—*Streptocara crassicauda*. A. Anterior extremity, ventral view. B. Anterior extremity, lateral view. C. Posterior extremity of female. (After Skrjabin.)

Type species: *S. pectinifera* (Neumann, 1900). ♂ 4.5 mm., ♀ 8–9.5 mm. In domestic fowl.

Syn., *Spiroptera pectinifera* Neumann, 1900.

Other species:

*S. californica* (Gedoelst, 1919). In *Oidemia deglandi*.

*S. cirrohamata* (Linstow, 1888). In *Phalacrocorax verrucosus*.

*S. crassicauda* (Creplin, 1829). In *Colymbus rufogularis*, *Mergus merganser*, and *Anas boschas*.

*S. crassicauda* var. *charadrii* Skrjabin, 1916. In *Vanellus cristatus*.

? *S. decora* (Duj., 1845). In *Alcedo ispida*.

Syn., *Yseria decora* (Duj., 1845) Gedoelst, 1919.

*S. recta* (Linstow, 1879). In *Podiceps cristatus*.

*S. stellæ-polaris* (Parona, 1901). In *Fulmarus glacialis*.

*S. triænuca* (Wright, 1879). In *Botaurus minor*.

*S. tridentata* (Linstow, 1877). In *Colymbus arcticus* and *Larus* sp.

Refs. 154, 161, 452, 572.

## FAMILY TETRAMERIDÆ TRAVASSOS, 1914.

*Definition*.—SPIRUROIDEA: exhibiting extraordinary sexual dimorphism, the female being greatly distended towards the middle of the body and fusiform in shape; males filiform. The males are generally free in the crop of birds, and the females are encysted in its wall; rarely in reptiles.

## Subfamily TETRAMERINÆ Railliet, 1915.

*Definition*.—TETRAMERIDÆ: with the characters of the family.

Genus TETRAMERES Creplin, 1846.

Syn., *Tropisurus* Diesing, 1835.

*Tropidurus*\* Wiegmann, 1835, preoccupied.

*Tropidocerca* Diesing, 1851.

*Astomum* Schlotthauber, 1860.

*Acanthophorus* Linst., 1876.

*Definition*.—TETRAMERINÆ: mouth with small lips; vestibule cylindrical; œsophagus cylindrical; intestine a thin-walled, wide tube. Male: thread-like, white, sometimes with spines along the median and lateral lines; spicules very unequal, the larger sometimes being about two-thirds the length of the body. Female: fusiform, red, with well-marked transverse striations in the middle region, and with longitudinal depressions corresponding to the median and lateral lines; vulva in the posterior part of the body; the uterus is enormously developed, occupying the greater part of the body, and containing thin-shelled eggs, with fully-developed embryos. Parasitic in the proventriculus of birds and rarely in reptiles, the females burrow into the glands, and the males lie free in the lumen of the organ.

Type species: *T. paradoxa* Diesing, 1835. ♂ 10–12 mm., ♀ 6–8 mm. In *Catharistes atratus*, etc.

Syn., *Tropisurus paradoxus* Dies., 1835.

*Tropidurus paradoxus* (Dies., 1835) Wiegmann, 1835.

*Tropidocerca paradoxa* (Dies., 1835) Diesing, 1852.

Other species:

*T. bispinosa* (Molin, 1860). In *Scincus* sp.

*T. certa* (Leidy, 1866). In *Diomedea* sp.

*T. coccinea* (Seurat, 1914). In *Phœnicopterus* sp.

*T. cochleariæ* Travassos, 1917. In *Cancroma cochlearia*.

\* *Tropidurus* is the emended form for *Tropisurus* and according to Art. 19 of the International Code the emendation was permissible on the ground that *Tropisurus* represents an error of transcription.

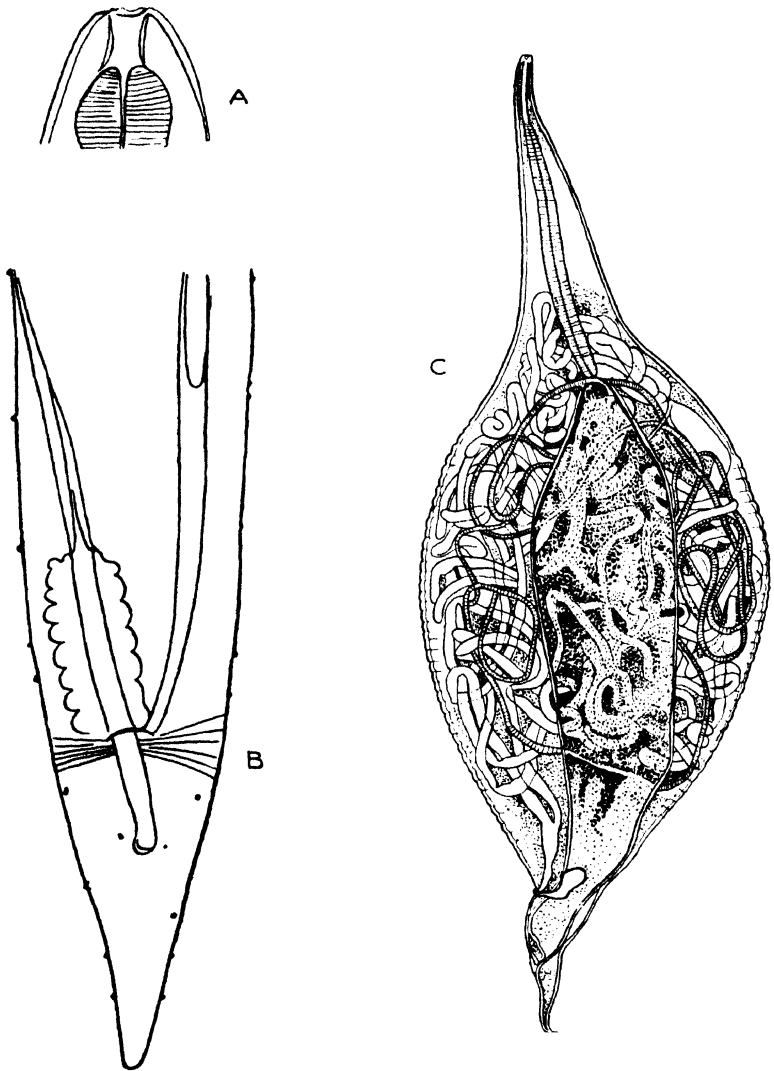


Fig. 247.—*Tetrameres* (*Tetrameres*) *paradoxa*. A. Anterior extremity.  $\times 120$ .  
 B. Posterior extremity of male, ventral view.  $\times 53$ . (After Drasche.)  
*Tetrameres* (*Tetrameres*) *fissispina*. C. Female, young. (After Travassos.)

- T. confusa* Travassos, 1917. In *Gallus domesticus*.  
*T. contorta* (Weidman, 1913). In *Dichocercus bicornis*.  
*T. cruzi* Travassos, 1914. In *Bucco* sp., *Melanerpes* sp.  
*T. dubia* Travassos, 1917. In *Gallinago* sp.  
*T. fissispina* (Diesing, 1861). In *Anas* sp., *Gallus* sp., etc.  
 Syn., *Acanthophorus tenuis* Linstow, 1876.

- T. gigas* Travassos, 1917. In *Anas boschas*.  
*T. globosa* (Linstow, 1879). In *Fulica* sp.  
*T. gynæcophila* (Molin, 1858). In *Nycticorax* sp.  
*T. hæmochrous* Creplin, 1846. In *Falco* sp., *Ciconia* sp., etc.  
*T. inermis* (Linstow, 1879). In *Astur* sp., *Corvus* sp.  
*T. inflata* (Mehlis, 1846). In *Anas* sp., etc.  
*T. lhuillieri* (Seurat, 1918). In *Caccabis petrosa*.  
*T. micropenis* Travassos, 1915. In *Nycticorax* sp., etc.  
*T. minima* Travassos, 1914. In *Tachyphonus* sp.  
*T. nouveli* (Seurat, 1914). In *Himantopus* sp.  
*T. pusilla* Travassos, 1915. In *Turdus* sp.  
*T. spiralis* (Seurat, 1915). In *Bubulcus* sp.  
*T. tetrica* Travassos, 1917. In *Aramides* sp.  
*T. unispina* (Diesing, 1861). In *Corvus cornix*.

Travassos (1915) divided the genus into two subgenera as follows :—

**Subgenus TETRAMERES** (Creplin, 1846) Travassos, 1915.

*Definition*.—*Tetrameres* in which the spicules are relatively short, *i.e.*, in proportion to the body length, the larger is three to six times as long

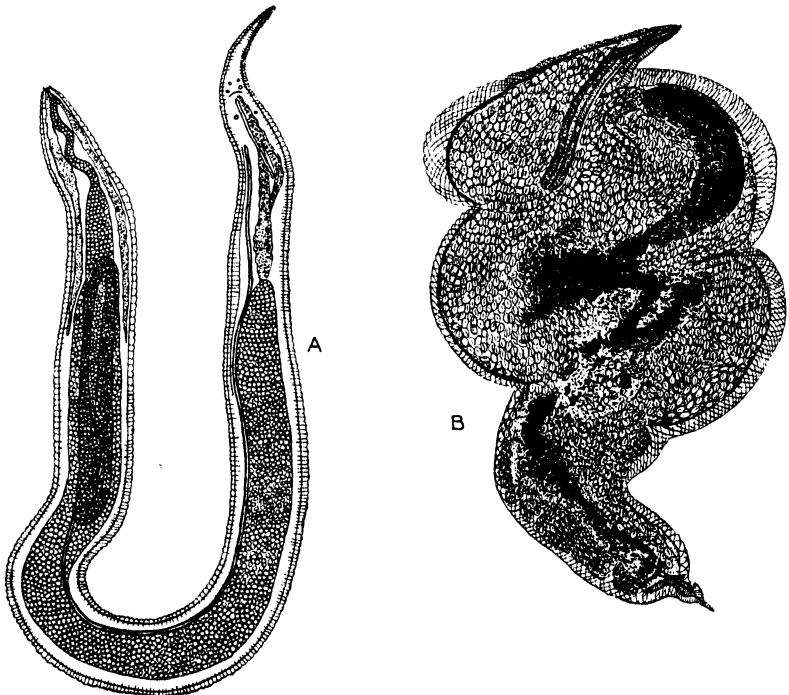


Fig. 248.—*Tetrameres* (*Microtetrameres*) *cruzi*. A. Male. B. Female. (After Travassos.)

as the smaller; the cuticle is spined in the lateral fields. Contains the species *paradoxa*, *confusa*, *dubia*, *fissispina*, *gigas*, *micropenis*, *nouveli*, and *tetrica*.

**Subgenus MICROTETRAMERES Travassos, 1917.**

*Definition.*—*Tetrameres* in which the spicules are relatively very long, the larger being about two-thirds the length of the body, the smaller being slightly chitinated; the cuticle is not spined in the lateral fields. Females very often with a longitudinal torsion. Contains the species *cruzi*, *contorta*, *inermis*, *inflata*, *minima*, *pusilla*, and *spiralis*.

Refs. 115, 123, 128, 131, 310, 503, 506, 507, 548, 622, 625, 634.

**FAMILY ANCYRACANTHIDÆ RAILLIET, 1916.**

*Definition.*—SPIRUROIDEA: head provided with more or less prominent appendages of very diverse appearance.

**KEY TO SUBFAMILIES.**

- Cephalic appendages in form of four  
long, feathered processes, directed  
posteriorly . . . . . Ancyracanthinae, p. 364.  
Cephalic appendages not consisting of  
four long feathered processes . . . Schistorophinae, p. 365.

**Subfamily ANCYRACANTHINÆ n. sf.**

*Definition.*—ANCYRACANTHIDÆ: from each side of the head arise two posteriorly directed feathered processes.

**Genus ANCYRACANTHUS Diesing, 1838.**

*Definition.*—ANCYRACANTHINÆ: head composed of two large lateral dome-shaped lips from each of which, and from the adjacent parts of the body, arise two prominent feathered appendages directed backwards and outwards, they are slightly curved with the concavity forwards, and not as figured by Diesing with the convexity forwards; surrounding the anterior part of the oesophagus are four club-shaped organs (apparently analogous to the blind cervical sacs of the *Gnathostomidæ*). Male: posterior extremity conical and spirally rolled; small caudal alæ; spicules long and equal; two pairs of large preanal, and one pair of small postanal, papillæ. Female: posterior extremity short and slightly bent; vulva in the posterior third of the body; vagina long; uteri divergent. Oviparous, eggs elliptical, with a thin shell.

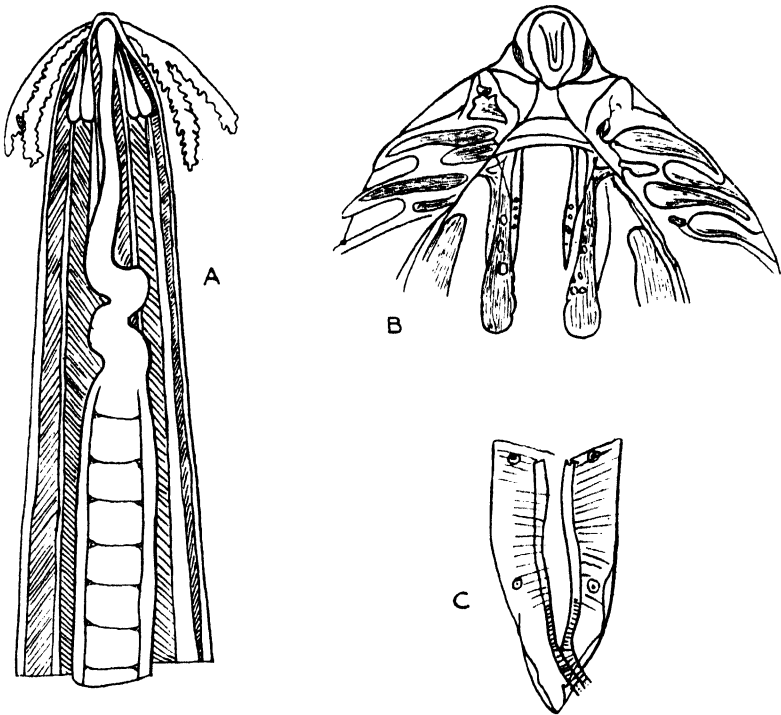


Fig. 249.—*Ancyracanthus pinnatifidus*. A. Anterior extremity, ventral view. (After Diesing.) B. Anterior extremity.  $\times 85$ . C. Posterior extremity of male, ventral view.  $\times 20$ . (After Drasche.)

Type species: *A. pinnatifidus* Diesing, 1839. ♂ 50 mm., ♀ 60–62 mm. In *Podocnemis expansa* and *P. tracaxa*.

Syn., *A. pectinatus* Dies., 1838 [renamed].

Refs. 46, 86, 122, 125, 128, 131, 405.

Subfamily SCHISTOROPHINÆ Travassos, 1918.

*Definition*.—ANCYRACANTHIDÆ: cephalic appendages in the form of a hood-like covering, or of various cuticular expansions, appendages, or processes.

KEY TO GENERA.

1. Mouth circular without lips; head provided with a ring-shaped cuticular swelling, slightly overlapping the body externally. Viguiera, p. 370.



- Mouth oval with two lateral lips ;  
 head provided with a sort of  
 double collar (anterior and pos-  
 terior portions), each subdivided  
 longitudinally into a number of  
 prominences . . . . . Torquatella, p. 372.
- Head with multiple and varied  
 cuticular expansions . . . . . Serticeps, p. 373
- Head with two or four laterally  
 placed cuticular wings, directed  
 postero-externally . . . . . 2
2. Wings subdivided externally into  
 finger-like processes . . . . . 3
- Wings not subdivided externally  
 into finger-like processes . . . . . 4
3. With two wings on each side, and  
 without inflation of cervical  
 cuticle . . . . . Ancyracanthopsis, p. 369.
- With one wing on each side, and  
 with inflation of cervical cuticle  
 to form a collar of longitudinal  
 rib-like thickenings . . . . . Histiocephalus, p. 369.
4. Wings pointed and dorso-ventral  
 in position. Male with numerous  
 sessile preanal papillæ . . . . . Schistorophus, p. 366.
- Wings hemispherical and lateral in  
 position. Male with six pairs of  
 pedunculated preanal papillæ . . . . . Sciadiocara, p. 367.

**Genus SCHISTOROPHUS** Railliet, 1916.

Syn., *Tetracanthus* Hemprich and Ehrenberg, MS. in  
 Schneider, 1866, preoccupied.

*Ancyracanthus* Schneider, 1866, in part, not Dies.,  
 1838.

*Definition.*—SCHISTOROPHINÆ: mouth with two small lateral  
 lips ; head furnished with four pointed cuticular wings, two  
 dorsally and two ventrally, directed outwards and backwards,  
 merging with the cuticle in front, more or less united at their  
 origin, especially in the mid-lines, and arranged like a roof ; vesti-  
 bule long ; œsophagus consists of two parts. Male : tail blunt ;  
 provided with alæ ; numerous preanal papillæ in a long simple  
 row ; spicules unequal. Female : tail short and more or less

obtuse or conical; vulva in the posterior, or middle, region of the body. Sometimes viviparous. Parasites of the coats of the gizzards of birds.

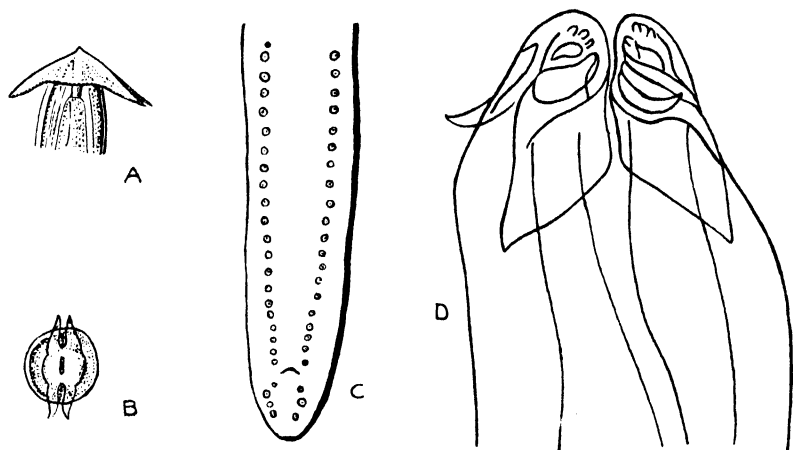


Fig. 250.—*Schistorophus longicornis*. A. Anterior extremity, lateral view.  $\times 90$ . B. Head, end-on view.  $\times 90$ . C. Posterior extremity of male, ventral view.  $\times 62$ . (After Schneider.) *Schistorophus aulicatina*. D. Anterior extremity, ventral view. (After Skrjabin.)

Type species: *S. longicornis* (Hemprich and Ehrenberg, 1866).  
 $\sigma$  5–10 mm.,  $\phi$  8–20 mm. In *Numenius arquatus*, *Tringa* sp.,  
*Totanus* sp.

Syn., *Tetracanthus longicornis* Hemprich and Ehrenberg, 1866.  
*Ancyracanthus longicornis* (Hemprich and Ehrenberg,  
 1866) Schneider, 1866.

Other species:

? *S. acanthocephalicus* (Molin, 1860). In *Sterna* spp.

*S. aulicatina* Skrjabin, 1916. In *Hæmatopus* sp.

*S. bicuspis* (Rud., 1819). In *Squalarola helvetica*.

*S. bidens* (Rud., 1819). In *Astur* sp., *Merops* sp.

? *S. capillaris* (Molin, 1860). In *Sterna hirundo*.

*S. laciniatus* (Molin, 1860). In *Rallus cayennensis*.

? *S. spinulosus* (Molin, 1860). In *Glareola austriaca*.

Refs. 128, 404, 480, 572, 636.

#### Genus **SCIADIOCARA** Skrjabin, 1916.

*Definition*.—SCHISTOPHORINÆ: mouth with two small lateral conical lips, each bearing two papillæ; behind each lip is a pair of hemispherical membranous wings, directed posteriorly and forming an acute angle with the body; vestibule cylindrical, with thick

walls ; œsophagus long and cylindrical, consisting of two parts. Male : posterior extremity rounded ; caudal alæ present ; six pairs of pedunculated preanal papillæ, and about five pairs of postanal papillæ ; spicules very unequal, the smaller being provided with a canal through which the larger moves, thus serving the function of a gubernaculum. Female : posterior extremity

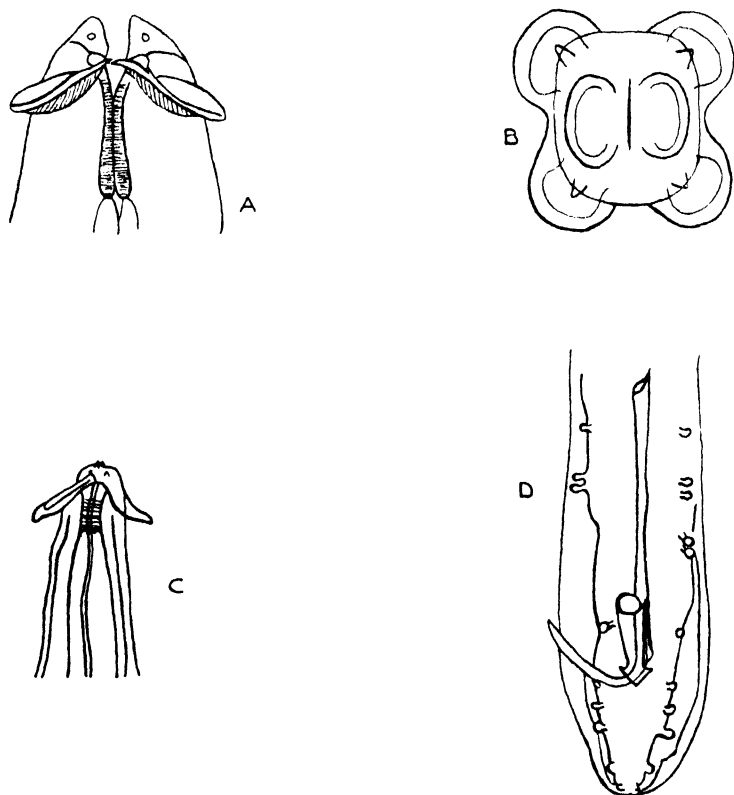


Fig. 251.—*Sciadiocara umbellifera*. A. Anterior extremity, ventral view.  $\times 470$ . B. Anterior extremity, end-on view.  $\times 470$ . (After Drasche.) C. Anterior extremity. D. Posterior extremity of male, ventral view. (After Skrjabin.)

bent and bluntly rounded ; vulva a little behind the middle of the body. Oviparous, eggs oval, with thick shells, containing an embryo when deposited. Parasites of the gizzard of birds.

Type species : *S. umbellifera* (Molin, 1860). ♂ 6.4 mm., ♀ 9–10 mm. In gizzard of *Ibis* sp., *Scolopax* sp., *Totanus* sp.

Syn., *Spiroptera umbellifera* Molin, 1860.

Refs. 128, 358, 572.

Genus **ANCYRACANTHOPSIS** Diesing, 1861.

*Definition.*—SCHISTOROPHINÆ: body capillary, mouth with two small lips, each furnished with a small inner and a larger outer tooth, from each lip arise two appendages, directed posteriorly. (Molin and Diesing state, that these appendages are feathered, but Drasche (1884), who figures the head of the worm, states that each process subdivides into four equal digitations, and adds, that the head is extremely small. Drasche's figure is quite unlike that of *Ancyracanthus*.) The œsophagus, which is divided into an anterior thin, and a posterior thicker part, is long and measures nearly a third of the length of the worm. Male: posterior extremity bent spirally; caudal alæ present; with a number of simple papillæ; spicule single! Female: posterior extremity sometimes bent spirally, tail conical; vulva in the posterior part of body. Parasitic between the coats of the ventriculus of birds.

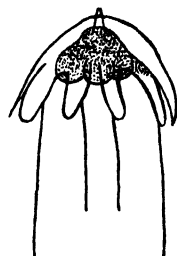


Fig. 252.—*Ancyracanthopsis bilabiata*. Anterior extremity, lateral view.  $\times 140$ . (After Drasche.)

Type species: *A. bilabiata* (Molin, 1860). ♂ 7 mm., ♀ 9 mm. In *Eurypyga helias*.

Syn., *Ancyracanthus bilabiatus* Molin, 1860.

Refs. 86, 125, 128, 359.

Genus **HISTIOCEPHALUS** Diesing, 1851.

*Definition.*—SCHISTOROPHINÆ: mouth surrounded by four lips, the lateral being much larger and trilobed and each bearing two small papillæ, the dorso-ventral each bear a pair of large papillæ [between the lateral and dorso-ventral lips are four large club-shaped papillæ (Drasche)]. Behind the lips are two lateral membranous appendages directed posteriorly, the free margins of which are split into six or twelve processes, each of which may or may not have a bifid or trifid extremity; the cervical cuticle is inflated to form a collar, consisting of longitudinal rib-like thickenings; mouth cavity infundibular; œsophagus long and cylindrical. Male: with wide caudal alæ; four pairs of costiform preanal papillæ and two pairs of costiform postanal papillæ; spicules equal (Drasche states unequal). Female: vulva in front of the middle of the body. Parasites of the gizzard wall of birds and ? fishes.

Type species : *H. laticaudatus* (Rud., 1819). ♂ 8–12·5 mm.,  
♀ 20–24 mm. In *Otis tetrax*.

Syn., *Spiroptera laticaudata* Rud., 1819.

*Dispharagus laticaudatus* (Rud., 1819) Duj., 1845.

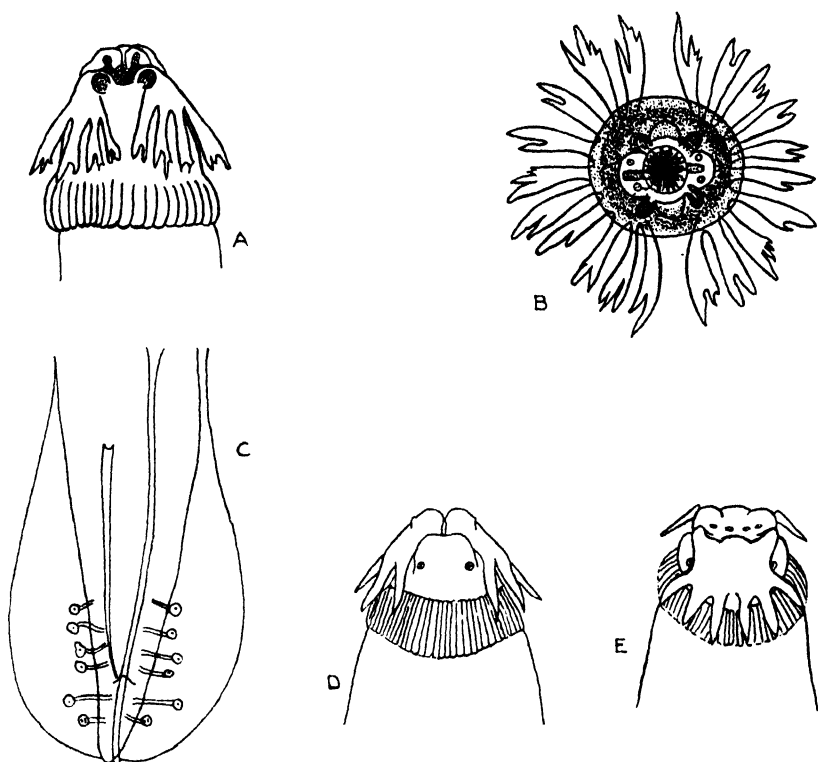


Fig. 253.—*Histiocephalus laticaudatus*. A. Anterior extremity, ventral view.  $\times 250$ . B. Anterior extremity, end-on view.  $\times 250$ . C. Posterior extremity of male, ventral view.  $\times 250$ . (After Drasche.) *Histiocephalus tridens*. D. Anterior extremity, ventral view. E. Anterior extremity, partial end-on view. (After Gendré.)

Other species :

? *H. coronatus* (Molin, 1860). In *Alcedo* sp., *Rallus* sp.

? *H. minutus* (Rud., 1819). In *Platessa flesus*.

*H. tridens* Gendré, 1921. In *Trachelotis senegalensis*.

Refs. 123, 128, 154, 175, 477, 572.

Genus **VIGUIERA** Seurat, 1918.

**Definition.**—SCHISTOROPHINÆ: body sharply attenuated anteriorly; mouth without definite lips, but cephalic extremity

covered by a circular disc or ring-like swelling, which slightly overlaps the subjacent portion externally; behind this swelling are two large lateral and four small submedian papillæ; vestibule cylindrical, with thick walls; lateral flanges absent; cervical papillæ very far in front of the nerve ring. Male: tail spirally

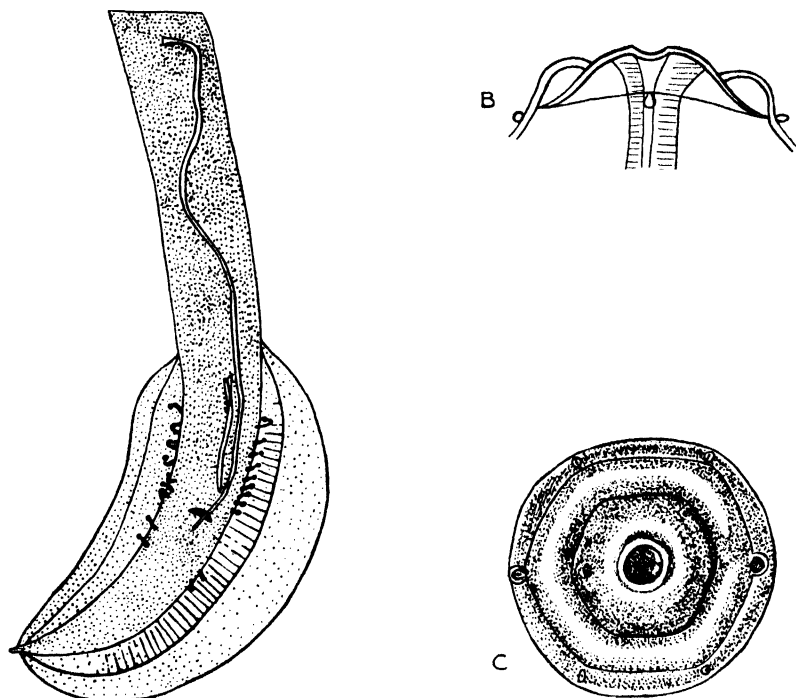


Fig. 254.—*Viguiera euryoptera*. A. Posterior extremity of male, ventral view.  $\times 80$ . (After Seurat.) *Viguiera turdi*. B. Anterior extremity, lateral view.  $\times 1,000$ . C. Anterior extremity, end-on view.  $\times 1,000$ . (After Drasche.)

rolled; caudal alæ asymmetrical; with seven to nine pairs of preanal papillæ, and two pairs of postanal papillæ; spicules very unequal; gubernaculum absent. Female: tail regularly attenuate to the extremity; vulva just in front of the anus; ovejector very long; uteri divergent. Parasites in wall of stomach of birds.

Type species: *V. euryoptera* (Rud., 1819). ♂ 5 mm., ♀ 9–10 mm. In *Lanius* spp.

Syn., *Spiroptera euryoptera* Rud., 1819.

*Acuaria laniorum* Molin, 1860.

Other species: *V. turdi* (Molin, 1860). In *Turdus musicus*.

Refs. 128, 131, 358, 477, 495, 514.

Genus **TORQUATELLA** n.g.

*Definition.*—SCHISTOROPHINÆ: mouth with two lateral lips, limiting a tubular mouth cavity, and bearing posteriorly a number of small teeth; behind the lips is a complicated cuticular collar consisting of a double circular row (anterior and posterior) of prominences, the continuity of which is interrupted at the level of the submedian lines by four oval depressions, each containing

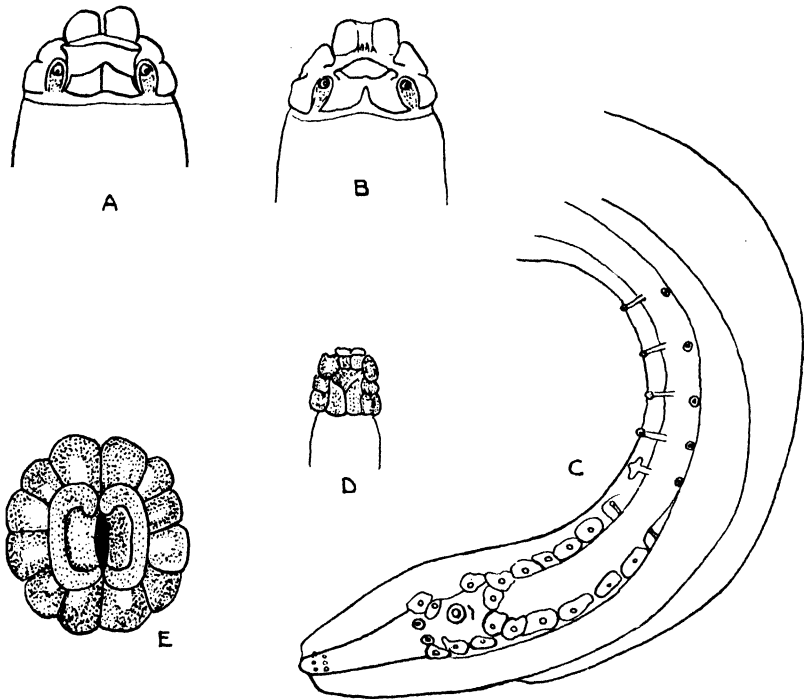


Fig. 255.—*Torquatella torquata*. A. Anterior extremity, ventral view. B. Anterior extremity, lateral view. C. Posterior extremity of male. (After Gendre.) *Torquatella conocephala*. D. Anterior extremity, lateral view.  $\times 280$ . E. Anterior extremity, end-on view.  $\times 470$ . (After Drasche.)

a small papilla; the number of prominences into which the collar is subdivided varies in the different species, but it is greater in the posterior row than in the anterior; vestibule cylindrical, with thick walls; œsophagus cylindrical; cervical papillæ at the level of the nerve ring. Male: with caudal alæ; numerous preanal, and about three pairs of postanal, papillæ; spicules unequal; gubernaculum lightly chitinated. Female: vulva in the posterior half of the body. Ovejector directed forwards; uteri divergent. Oviparous. Parasites of birds.

Type species : *T. torquata* (Gendre, 1922). ♂ 7 mm., ♀ 13–19 mm.  
In *Centropus monachus*.

Syn., *Spiroptera torquata* Gendre, 1922.

*Spiroptera conocephala* Molin, 1860, of Gendre, 1921.

Other species :

*T. balanocephala* (Gendre, 1922). In *Merops malinbicus*.

Syn., *Spiroptera balanocephala* Gendre, 1922.

*T. conocephala* (Molin, 1860). In *Cuculus cayanus*.

Syn., *Spiroptera conocephala* Molin, 1860.

Refs. 128, 176, 177, 358.

**Genus SERTICEPS** Railliet, 1916.

*Definition*.—SCHISTOROPHINÆ : mouth surrounded by six small lips, each bearing a papilla ; the head is provided with the follow-

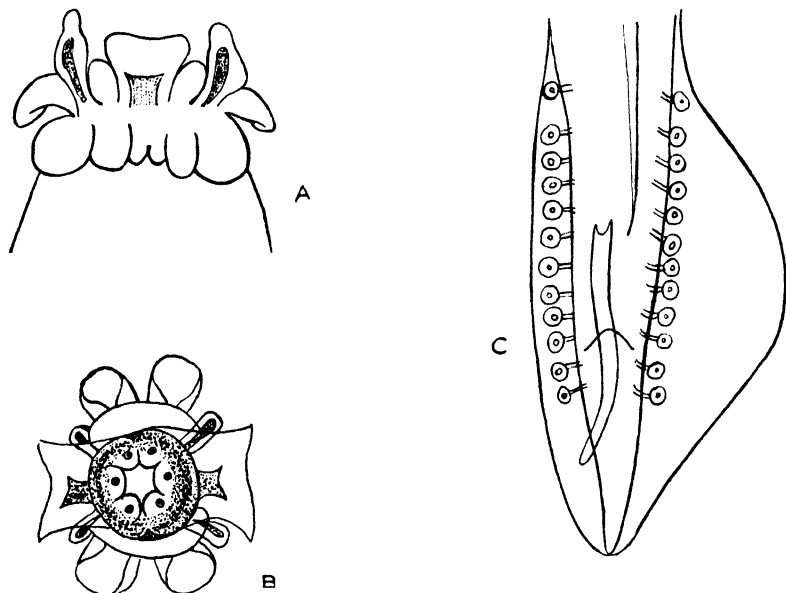


Fig. 256.—*Serticeps vulvoinflatus*. A. Anterior extremity, lateral view.  $\times 470$ . B. Anterior extremity, end-on view.  $\times 170$ . C. Posterior extremity of male, ventral view.  $\times 120$ . (After Drasche.)

ing complicated arrangement of cuticular appendages : on each side behind the lips is an outwardly directed bird-tail shaped delicate appendage, and further backwards, dorsally and ventrally, is an outwardly directed crescentic appendage, still further backwards are four submedian rectangular outwardly directed lobes with turned-up edges, and finally there follows a crown of numerous



posteriorly directed appendages of different sizes ; between the dorso-ventral and submedian appendages are four long club-shaped papillæ directed outwards and forwards. Male : posterior extremity obtuse ; caudal alæ asymmetrical supported by twelve pairs of costiform papillæ, of which ten pairs are preanal ; spicules very unequal. Female : tail obtuse ; vulva near anus. Parasites of the gizzard of birds.

Type species : *S. vulvoinflatus* (Molin, 1860). ♂ 10 mm., ♀ 28 mm. In *Trochilus ochropygus*.

Syn., \**Spiroptera vulvoinflata* Molin, 1860.

Refs. 128, 358, 404.

### FAMILY HEDRURIDÆ RAILLIET, 1916.

*Definition*.—SPIRUROIDEA : mouth surrounded by four highly specialized lips ; vestibule narrow and cylindrical. Males always rolled about the females, the posterior end of which is invaginated, forming a sucker-like groove, from which projects a chitinous hook, which serves as a fixation organ. Oviparous, eggs oval, with an operculum at each pole, and containing embryos at deposition.

Genus **HEDRURIS** Nitzsch, 1821.

Syn., *Heteroura* Sieb., 1836.

*Synplecta* Leidy, 1851.

*Definition*.—HEDRURIDÆ : mouth with four lips ; the lateral chitinous, narrower, with the free edges rounded, and each possessing two papillæ ; the two median lips thinner and cuticular, having the form of an isosceles triangle, the apex of which is truncated and the two sides hollowed out, the base is bound to the body only along its middle portion, and projects laterally to such an extent as almost to cover the two lateral lips. Behind the lips are eight cone-shaped cuticular swellings. The mouth leads into a cylindrical vestibule ; œsophagus long and slender, provided at its anterior extremity with a festooned chitinous ring, and apparently undivided. Male : tail spirally twisted, and laterally compressed ; with one preanal papilla, and six postanal papillæ ; spicules equal ; gubernaculum present or absent. Female : thicker posteriorly than anteriorly ; the posterior end can be invaginated forming a sort of sucker from which projects a

\* There is apparently an error in the numbering of the figures constituting Plate XII of Drasche's work : the figures representing the head of *Sp. vulvoinflata* should be 15 and 16, and not 14 and 15.

chitinous hook, the worm being attached to the mucous membrane of the stomach by means of this pseudo-sucker ; vulva near anus. Oviparous, eggs elliptical and possess at each pointed end an

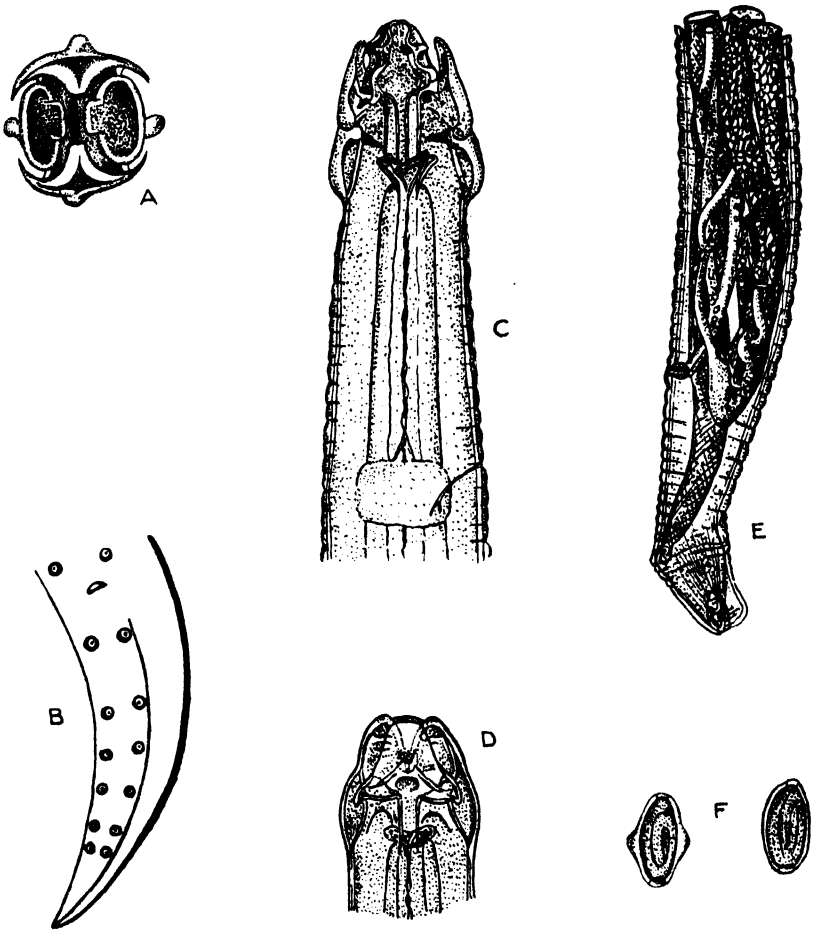


Fig. 257.—*Hedruris androphora*. A. Anterior extremity, end-on view.  $\times 130$ . B. Posterior extremity of male. (After Schneider.) *Hedruris siredonis*. C. Anterior extremity, lateral view.  $\times 110$ . D. Anterior extremity, ventral view.  $\times 132$ . E. Posterior extremity of female.  $\times 28$ . F. Eggs.  $\times 260$ . (After Chandler.)

operculum-like structure, they are thickened laterally, and contain embryos at deposition. Parasites of reptiles and amphibia.

Type species : *H. androphora* Nitzsch, 1821. ♂ 8 mm., ♀ 10 mm. In *Triton cristatus*.

Syn., *Heteroura androphora* (Nitzsch, 1821) Sieb., 1836.

*Synplecta pendula* Leidy, 1851.

Other species :

*H. armata* Perrier, 1871. In *Clemmys guttata*, *Chrysemys picta*.

*H. hipsirhinæ* Chatin, 1876. In *Hipsirhina bocourti*.

*H. orestiaë* Moniez, 1889. In *Orestias* sp.

*H. siredonis* Baird, 1858. In *Siredon mexicanus*, *Notophthalmus torosus*.

*H. squamata* Linst., 1909. In *Clemmys guttata*.

Refs. 87, 131, 272, 374, 405, 480, 569.

#### FAMILY CAMALLANIDÆ RAILLIET AND HENRY, 1915.

*Definition*.—SPIRUROIDEA : mouth elongate dorso-ventrally ; buccal capsule chitinous, either continuous or consisting of two lateral shell-like valves ; œsophagus composed of an anterior muscular portion, and a long posterior glandular portion. Male : posterior extremity curved ventrally ; caudal alæ present ; papillæ variable in number, mostly pedunculated and projecting into the alæ ; spicules unequal and dissimilar. Female : vulva near the middle of the body ; vagina directed posteriorly ; uteri opposed, the posterior limb ending blindly without an ovary. Viviparous.

#### KEY TO GENERA.

1. Buccal capsule continuous, not separated into paired lateral valves, the wall may be smooth or with spiral markings internally . . . . . Procamallanus, p. 379.  
     Buccal capsule consisting of two lateral valves . . . . . 2
2. Buccal valves with large external thickenings, and posteriorly directed chitinous structures in the form of simple rods . . . . . Camallanides, p. 379.  
     Buccal valves without large external thickenings, and with posteriorly directed chitinous structures in the form of tridents. . . . . 3
3. With a large chitinous buccal cavity or pharynx, behind the chitinous valves . . . . . Paracamallanus, p. 378.  
     Without a chitinous buccal cavity behind the valves . . . . . Camallanus, p. 377.

Genus **CAMALLANUS** Railliet and Henry, 1915.

Syn., *Cucullanus* auctt. not Mueller, 1777.

*Definition.*—**CAMALLANIDÆ**: mouth slit-like; buccal capsule consisting of two lateral chitinous valves, the internal surface of which is furnished with parallel longitudinal ribs, sometimes terminating at the buccal margin as little teeth; from the point of junction of the valves, dorsally and ventrally, a trident-shaped chitinous process is directed backwards: at its entry into the

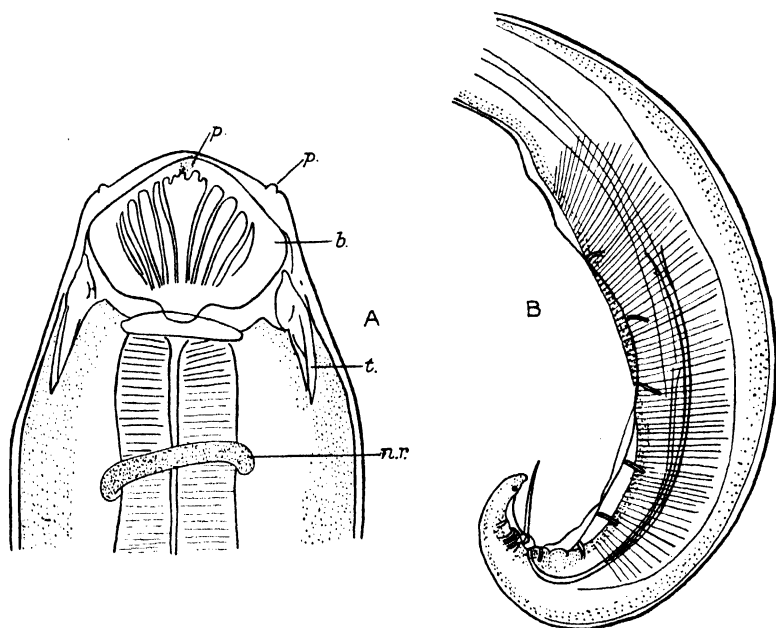


Fig. 258.—*Camallanus kachujæ*. A. Anterior extremity, lateral view. *p*, papilla; *b*, buccal valve; *t*, trident; *n.r.*, nerve ring.  $\times 170$ . B. Posterior extremity of male, lateral view.  $\times 70$ . (After Baylis and Daubney.)

œsophagus the capsule is surrounded by a circular collar; œsophagus in two parts, a short anterior muscular, and a long posterior glandular portion enlarged posteriorly. Male: posterior extremity rolled ventrally; small caudal alæ present; about seven pairs of costiform preanal papillæ supporting the alæ, two pairs of small adanal, and a number of postanal papillæ; spicules usually unequal and dissimilar, one being feebly chitinized; gubernaculum absent. Female: vulva about the middle of the body; uteri opposed, the posterior limb ending blindly without an

ovary. Viviparous. Parasites of stomach and intestine of fishes, batrachians, and reptiles.

Type species : *C. lacustris* Zoega, 1776. ♂ 5 mm., ♀ 9–10 mm. In many species of fishes.

Syn., *Echinorhynchus lacustris* Zoega, 1776.

*Cucullanus lacustris* (Zoega, 1776) Mueller, 1779.

*Cucullanus elegans* Zeder, 1800.

*Cucullanus coronatus* Zeder, 1800.

*Cucullanus papillosus* Zeder, 1800.

*Cucullanus armatus* Zeder, 1800.

*Cucullanus truncatus* Rudolphi, 1814.

*Cucullanus viviparus* Bloch, 1782, not Linstow, 1906.

Other species :

*C. americanus* Magath, 1919. In tortoises.

*C. ancylodirus* Ward and Magath, 1916. In carp.

*C. kachugæ* Baylis and Daubney, 1922. In *Kachuga smithii*.

*C. melanocephalus* (Rud., 1819). In *Pelamys* sp., *Auxis* sp., *Scomber* sp.

*C. microcephalus* (Duj., 1845). In *Emys lutaria*, etc.

Syn., ? *C. confusus* Railliet and Henry, 1915.

? *Cucullanus dumerilii* Perrier, 1871.

*C. nigrescens* (Linstow, 1906). In *Rana hexadactyla*.

*C. oxycephalus* Ward and Magath, 1916. In white bass and black crappie.

*C. papilliferus* (Molin, 1858). In *Acipenser sturio*.

*C. tridentatus* (Drasche, 1884). In *Vastres cuvieri*.

*C. trispinosus* (Leidy, 1851). In tortoises.

*C. undulatus* Railliet and Henry, 1915. In *Damonias* sp.

Syn., *Cucullanus viviparus* Linstow, 1906, not Bloch, 1782.

Refs. 34, 42, 129, 131, 272, 346a, 443, 522, 662, 681.

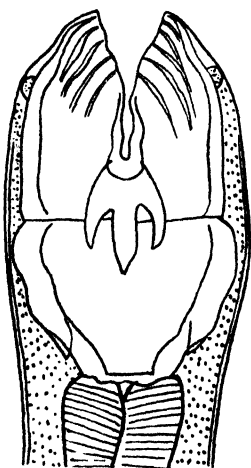


Fig. 259.—*Paracamallanus cyathopharynx*. Anterior extremity, dorsal view.  $\times 440$ . (After Baylis.)

#### Genus **PARACAMALLANUS** n.g.

**Definition.**—**CAMALLANIDÆ**: closely resembling *Camallanus*, but differing in the presence of a large chitinous buccal cavity or pharynx, behind the buccal valves.

Type species: *P. cyathopharynx* (Baylis, 1923). ♂ 5.9 mm., ♀ 9.2 mm. In *Heterobranchus anguillaris*.

Syn., *Camallanus cyathopharynx* Baylis, 1923.

Ref. 34.

Genus **CAMALLANIDES** Baylis and Daubney, 1922.

*Definition*.—**CAMALLANIDÆ**: resembles *Camallanus* except in the following particulars: each of the lateral chitinous buccal valves has two large thickenings externally, giving the appearance of two separate masses of chitin; the "tridents" are reduced to a simple rod-like structure on each side; the right spicule is alate; gubernaculum present; the vulva is borne on a tubular appendage.

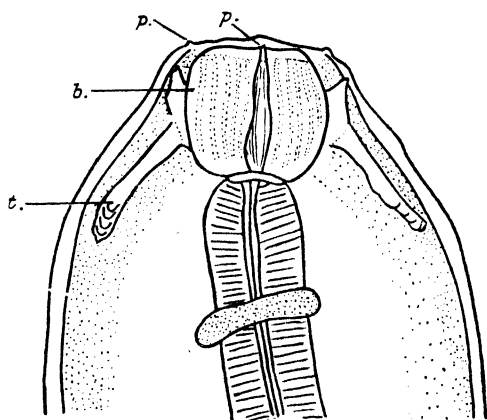


Fig. 260.—*Camallanides prashadi*. Anterior extremity, lateral view. *p*, papilla; *b*, buccal valve; *t*, rod-like structure.  $\times 190$ . (After Baylis and Daubney.)

Type species: *C. prashadi* Baylis and Daubney, 1922. ♂ 5.8–6.6 mm., ♀ 14.2–17.7 mm. In *Bungarus fasciatus*.

Ref. 42.

Genus **PROCAMALLANUS** Baylis, 1923.

*Definition*.—**CAMALLANIDÆ**: buccal capsule continuous, and not separated into paired lateral valves; the walls of the capsule may be smooth, or provided with spiral thickenings; tridents absent; oesophagus divided into an anterior muscular, and a longer posterior glandular part. Male: caudal alæ present; with nine pairs of costiform preanal papillæ, a few adanal, and some postanal papillæ. Female: posterior extremity conical, and ending in three very short blunt processes; vulva in front of the middle of the body; the posterior limb of the uterus ends blindly. Viviparous. Parasites of silurid fishes.

Type species : *P. læviconchus* (Wedl, 1862). ♂ 3.65 mm., ♀ up to 15.5 mm. In *Synodontis schaal*.

Syn., *Cucullanus læviconchus* Wedl, 1862.

*Camallanus læviconchus* (Wedl, 1862) Railliet and Henry, 1915.

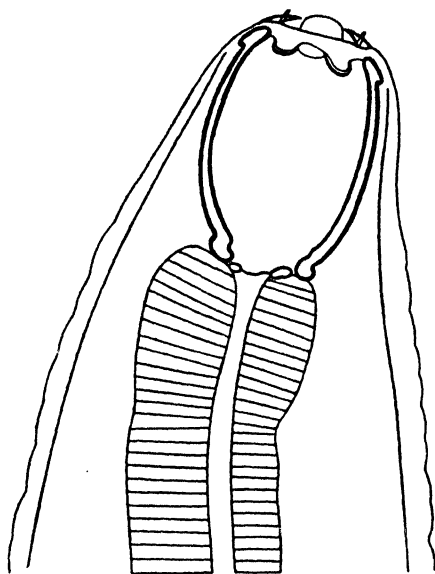


Fig. 261.—*Procammallanus læviconchus*. Anterior extremity, lateral view.  $\times 400$ . (Orig.)

Other species : *P. spiralis* Baylis, 1923. In *Heterobranchus anguillaris*.

Refs. 34, 35, 443, 664.

#### FAMILY CUCULLANIDÆ COBBOLD, 1864.

*Definition*.—SPIRUROIDEA : head consisting of two prominent lateral lips (or lobes) each bearing three papillæ, and bounding a slit-like mouth ; œsophagus muscular throughout with a club-shaped swelling posteriorly, and dilating anteriorly into a pseudo-buccal cavity ; intestine simple or with a cæcum. Male : preanal sucker present ; spicules equal or unequal ; gubernaculum usually present. Female : caudal extremity terminating conically and fairly abruptly ; vulva near the middle of the body ; vagina directed anteriorly, with two ovaries (except in *Dacnitoïdes*). Oviparous.

## KEY TO SUBFAMILIES.

- Without an intestinal cæcum ; with two ovaries . . . . . Cucullaninæ, p. 381.  
 With an intestinal cæcum ; with one ovary . . . . . Dacnitoidinæ, p. 384.

## Subfamily CUCULLANINÆ n.sf.

Syn., *Cucullanidæ* Barreto, 1916.

*Dacnitidæ* Baird, 1853, Lane, 1916.

*Definition*.—CUCULLANIDÆ: with a simple intestine. Male with a gubernaculum. Female with two ovaries.

## KEY TO GENERA.

1. Dorso-cephalic tubercle present . . . . . Bulbodaenitis, p. 383.  
    Dorso-cephalic tubercle absent . . . . . 2
2. Cuticular serration in addition to cuticular striation . . . . . Serradaenitis, p. 383.  
    Cuticular serration absent . . . . . Cucullanus, p. 381.

## Genus CUCULLANUS O. F. Mueller, 1777.

Syn., *Pleurorinchus* Nau, 1787.

*Pleurorhynchus* Rud., 1801.

*Ophiostoma* Rud., 1801, in part.

*Dacnitis* Duj., 1845.

*Stelmis* Duj., 1845.

*Dichelyne* Jägerskiöld, 1902.

*Definition*.—CUCULLANINÆ: anterior extremity bent dorsally ; lips bounding the mouth not chitinized, no chitinous buccal capsule, but a pseudo-capsule formed by the dilatation of the anterior end of the œsophagus, which is also enlarged posteriorly ; intestine simple. Male : preanal sucker without a chitinous rim ; caudal alæ absent ; spicules equal ; gubernaculum present. Female : vulva near the middle of the body ; vagina directed anteriorly ; two ovaries. Oviparous, eggs with a thin shell. Parasites of intestine of fishes.

Type species : *C. cirratus* Mueller, 1777. ♂ 16–18 mm., ♀ 20 mm. In *Gadus morrhua*, etc.

Syn., *C. muticus* Mueller, 1777.

*C. foveolatus* Rud., 1809.

*C. esuriens* (Duj., 1845).

*Dacnitis esuriens* Duj., 1845.

*Dacnitis gadorum* Beneden, 1858.



## Other species :

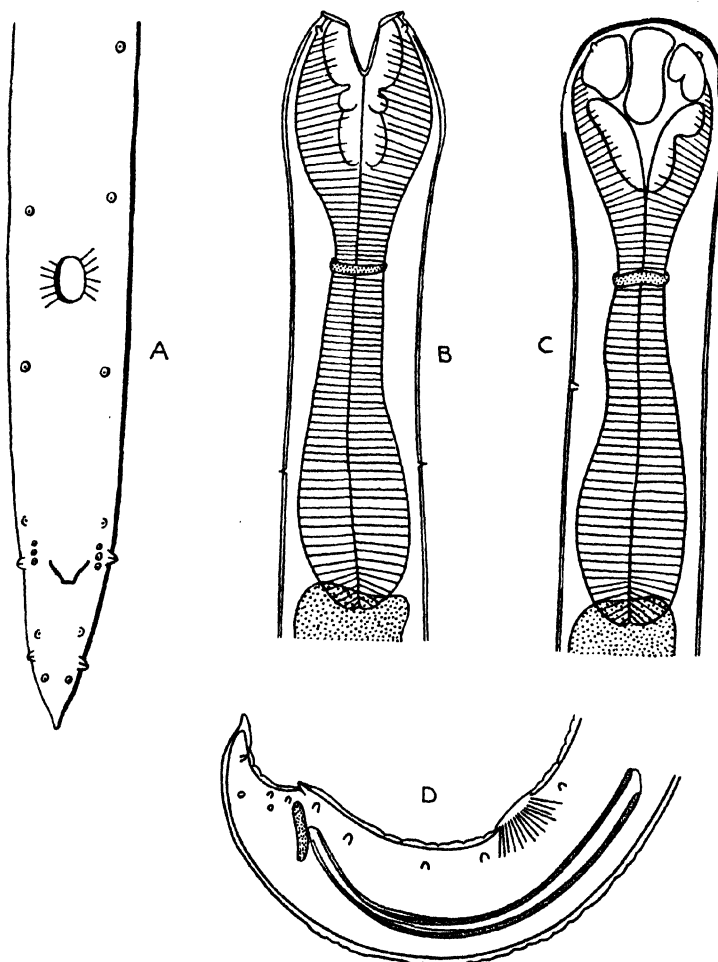
*C. abbreviatus* Rud., 1819. In *Perca* sp.*C. attenuatus* (Molin, 1859). In *Squalius cavedanus*.

Fig. 262.—*Cucullanus cirratus*. A. Posterior extremity of male, ventral view.  $\times 69$ . (After Schneider.) *Cucullanus carette*. B. Anterior extremity, ventral view.  $\times 52$ . C. Anterior extremity, lateral view.  $\times 52$ . D. Posterior extremity of male, lateral view.  $\times 52$ . (Orig.)

*C. barbi* Baylis, 1923. In *Barbus bynni*.*C. callichroi* (Stewart, 1914). In *Callichrous* sp.*C. carette* Baylis, 1923. In *Thalassochelys caretta*.*C. clarotis* Baylis, 1923. In *Clarotes* sp., *Synodontis* sp.

- C. clitellarius* Ward and Magath, 1916. In *Acipenser rubicundus*.
- C. dodsworthi* Barreto, 1922. In *Spheroides testudineus*.
- C. fossor* (Jägerskiöld, 1902). In *Lates niloticus*.  
Syn., *Dichelyne fossor*. Jägerskiöld, 1902.
- C. fusiformis* (Molin, 1860). In *Platessa flesus*.
- C. hians* (Duj., 1845). In *Muræna* sp., *Conger* sp.
- ? *C. longicollis* (Stossich, 1899). In *Mullus barbatus*.
- C. marinus* O. F. Mueller, 1779. In *Gadus morrhua*.
- C. præcinctus* (Duj., 1845). In *Conger vulgaris*.  
Syn., *Stelmus præcinctus* Duj., 1845.
- C. pulcherrimus* Barreto, 1918. In *Caranx lugubris*.
- C. rotundatus* (Molin, 1860). In *Cantharus vulgaris*.
- ? *C. sphærocephalus* (Rud., 1809). In *Acipenser* sp.  
Syn., *Ascaris sphærocephala* Rud., 1809.
- Ophistoma sphærocephalum* (Rud., 1809), Rud., 1819.
- C. stelmioides* (Vessicelli, 1910). In *Petromyzon planeri*.
- Refs. 11, 14, 34, 39, 131, 243, 260, 359, 366, 442, 443, 474, 522, 591.

Genus **BULBODACNITIS** \* Lane, 1916.

*Definition*.—CUCULLANINÆ: differentiated from *Cucullanus* only by the possession of a tubercle on the dorsal aspect of the head. Parasites of intestine of fishes.

Type species: *B. bulbosa* Lane, 1916. ♂ 13.3 mm., ♀ 14 mm. In *Caranx melampygus*.

Other species:

*B. globosa* (Zeder, 1800) Dujardin, 1845. In *Salmo fario*.

Syn., *Dacnitis globosa* Duj., 1845.

Refs. 16, 34, 260.

Genus **SERRADACNITIS** \* Lane, 1916.

*Definition*.—CUCULLANINÆ: distinguished from *Cucullanus* only by the presence of cuticular serrations, distinct from and in addition to the cuticular striations. Parasites of intestine of fishes.

Type species: *S. serrata* Lane, 1916. ♂ 15–16 mm., ♀ ? In *Tryonix gangeticus*.

Other species:

*S. squali* (Dujardin, 1845). In *Squalus galeus*.

Syn., *Dacnitis squali* Duj., 1845.

Refs. 16, 34, 260.

\* Barreto, 1922, is unable to find any justification for separating these genera from *Cucullanus*.

## Subfamily DACNITOIDINÆ n.sf.

Syn., *Dacnitoididæ* Travassos, 1920.

*Definition*.—CUCULLANIDÆ: intestine with an anterior cæcum. Male without a gubernaculum. Female with only one ovary.

## Genus DACNITOIDES Ward and Magath, 1916.

*Definition*.—DACNITOIDINÆ: anterior extremity not bent dorsally; lips bounding mouth not chitinized; no chitinous

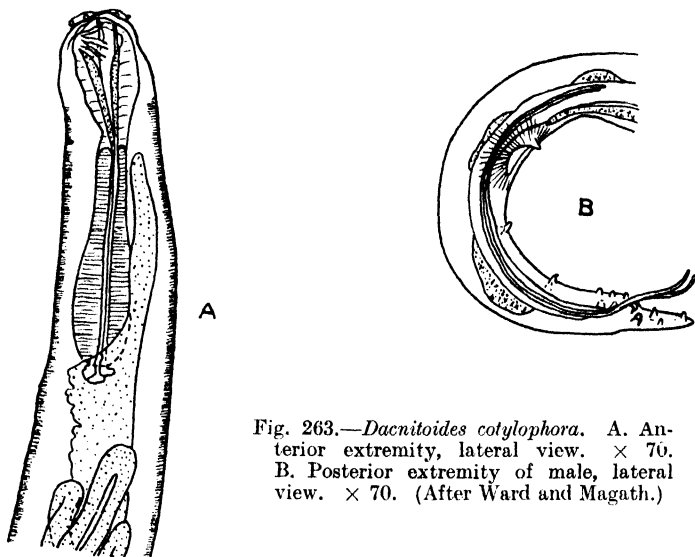


Fig. 263.—*Dacnitoides cotylophora*. A. Anterior extremity, lateral view.  $\times 70$ . B. Posterior extremity of male, lateral view.  $\times 70$ . (After Ward and Magath.)

buccal capsule, but a pseudo-capsule, formed by the dilatation of the anterior end of the œsophagus, which is also enlarged posteriorly; the intestine gives off, just behind the œsophagus, a diverticulum which is directed anteriorly. Male: preanal sucker without a chitinous rim; caudal alæ absent; spicules equal; gubernaculum absent. Female: vulva just behind the middle of the body; only one ovary, the posterior uterine limb ending blindly. Parasites of intestine of fishes.

Type species: *D. cotylophora* Ward and Magath, 1916. ♂ 4–6 mm., ♀ 4–5.5 mm. In *Perca flavescens* and *Stizostedion vitreum*.

Refs. 34, 662.

**SPIRUROIDEA** insufficiently known.Genus **ASCAROPHIS** Beneden, 1871.Syn., *Ascaropsis* Power and Sedgwick, 1880.

*Definition.*—**SPIRUROIDEA**: this genus was made by van Beneden to include a worm *A. morrhuæ* found by him in the

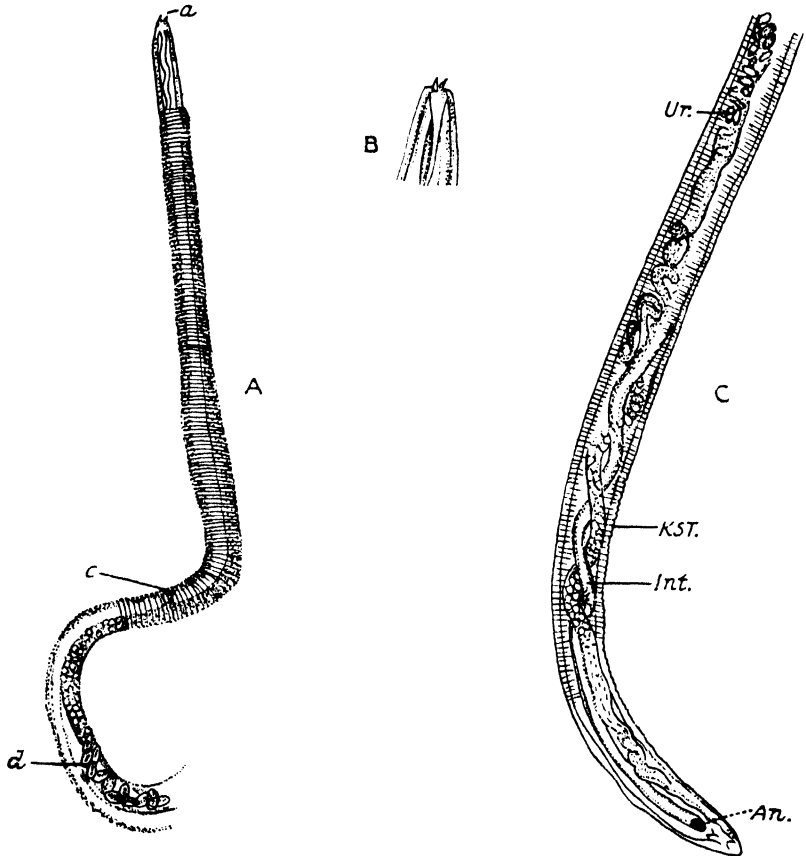


Fig. 264.—*Ascarophis morrhuæ*. A. Anterior extremity. *a*, cephalic spines; *c*, end of oesophagus; *d*, ova. B. Head. C. Posterior extremity of female. *Ur.*, uterus; *Kst.*, ovary; *Int.*, intestine; *An.*, anus. (After Nicoll.)

intestine and pyloric cæca of the cod. Very little description of the worm is given. Nicoll (1907) records female specimens from other fishes and gives an incomplete description. Female: body elongate, attenuated anteriorly and posteriorly, with a ventral excavation on the tail. Cuticle annulated by furrows encircling the body, these disappear towards the extremities. Head fur-

nished with two small spines, mouth terminal bordered by two simple lips; œsophagus long; posterior extremity tapers to a blunt point a short distance behind the anus. The ovary (*sic*) is in the posterior part of the body and the uterus (*sic*) occupies the whole of the remainder of the worm, and the middle part of the body is completely filled with eggs; vulva in the anterior (?) part of body. Oviparous, eggs with two filaments at one pole. Parasites of fishes.

Type species: *A. morrhuæ* Beneden, 1871. ♂?, ♀ 6–8 mm. In *Gadus morrhuæ*, *Gadus æglefinus*, *Hippoglossus vulgaris*, and *Cottus bubalis*.

Syn., *Ascaropsis morrhuæ* (Beneden, 1871) Power and Sedgwick, 1880.

Refs. 50, 373.

**Genus OSLERUS Hall, 1921.**

*Definition*.—SPIRUROIDEA?: small worms; mouth structure unknown, probably without distinct lips. Male: posterior extremity rounded? Spicules unequal. Female: posterior extremity rounded, vulva very close to anus. Ovoviviparous. Parasites of the respiratory passages of dogs.

Type species: *O. osleri* (Cobbold, 1879). ♂ 4 mm., ♀ 6–15 mm. In dogs.

Syn., *Strongylus canis bronchialis* Osler, 1877.

*Filaria osleri* Cobbold, 1879.

Refs. 103, 207, 382, 641.

**Generic Names given to Larval Spiruroidea.**

**Genus ASCAROPS Beneden, 1873.**

This generic name was given to a worm *Ascarops minuta* Beneden, 1873, syn., *Spiroptera minuta* (Bened.) Linstow, 1878 and 1909. This is a larval form of a Spirurid worm encapsuled in the stomach wall of *Vespertilio dasycneme*.

Refs. 51, 311, 332, 535.

**Genus CEPHALACANTHUS Diesing, 1853.**

This generic name, which is preoccupied by *Cephalacanthus* Lac., 1802, a fish, was created by Diesing for two worms, viz., *C. monacanthus* Dies., 1853, and *C. triacanthus* Dies., 1853, parasitic in insects. According to Seurat, 1916, the former is the larva of *Protopirura muris* and the latter that of *Physocephalus sexalatus*.

Refs. 125, 535.

Genus **DIKENTROCEPHALUS** Wedl, 1855.

Syn., *Dicentrocephalus* Dies., 1861.

This generic name was given to a worm *Dikentrocephalus crinalis* Wedl, 1855, found in *Lophius piscatorius*. It is a larval form provided with two lips; the adult is unknown, but presumably belongs to the *Spiruroidea*.

Refs. 125, 663b.

Genus **MASTOPHORUS** Diesing, 1853.

Under this generic name Diesing groups two species, viz., *M. echiurus* and *M. globocaudatus*, parasitic in insects. These are probably larval forms, and according to Seurat, 1916, the second is the larva of *Physocephalus sexalatus*.

Refs. 125, 535.

### Superfamily **FILARIOIDEA** Weinland, 1858 ; Stiles, 1907.

*Definition*.—**EUNEMATODA**: filiform worms; mouth usually simple and without lips, occasionally bounded by chitinous structures or by small insignificant lateral lips; buccal cavity or vestibule absent or very rudimentary, the œsophagus, which is cylindrical and frequently divided into two parts, reaching practically to the anterior extremity; intestine simple and sometimes atrophied posteriorly. Male: spicules usually very unequal and dissimilar. Female: almost always much longer than the male; vulva almost always in the œsophageal region. Parasites of the circulatory, lymphatic, muscular, or connective tissues, or of serous cavities, of vertebrates.

#### KEY TO FAMILIES.

- Females enormously longer than males;  
     vulva atrophied in gravid female . . . . . Dracunculidæ, p. 440.  
 Females at most three or four times as  
     long as males; vulva not atrophied in  
     gravid female . . . . . Filariidæ, p. 387.

### FAMILY **FILARIIDÆ** (COBBOLD, 1864) CLAUS, 1885.

Syn., *Filaridæ* Cobbold, 1864.

*Definition*.—**FILARIOIDEA**: females not more than three or four times as long as the males; mouth usually simple rarely bounded

by insignificant lateral lips and sometimes by chitinous structures ; cuticle usually smooth or finely striated transversely, but sometimes reinforced by annular thickenings and sometimes furnished with bosses. Male : with or without caudal alæ ; spicules usually quite dissimilar and very unequal, but rarely similar and equal or subequal ; gubernaculum present or absent. Female : vulva almost always in the œsophageal region ; amphidelphys or opisthodelphys. Oviparous or viviparous.

## KEY TO SUBFAMILIES.

1. Mouth surrounded by a chitinous ring  
or by lateral epaulette-like structures or by small spinous teeth . . . . . Setariinæ, p. 421.  
Mouth simple not bounded by chitinous structures . . . . . 2
2. Trident-like chitinous structures on each side of anterior end of œsophagus . . . . . Diplotriæninæ, p. 432.  
Trident-like structures absent . . . . . 3
3. Vulva in a constriction just in front of posterior extremity . . . . . Crassicaudinæ, p. 437.  
Vulva near middle of body . . . . . Micropleurinæ, p. 434.  
Vulva in œsophageal region or immediately posterior to it . . . . . 4
4. Cuticle provided with bosses . . . . . Loainæ, p. 417.  
Cuticle reinforced by annular thickenings . . . . . Onchocercinæ, p. 412.  
Cuticle smooth or finely transversely striated . . . . . 5
5. Spicules dissimilar and unequal . . . . . Filariinæ, p. 388.  
Spicules similar and equal or subequal . . . . . Aproctinæ, p. 404.  
*Filariidæ* insufficiently known, p. 437.

## Subfamily FILARIINÆ Stiles, 1907.

*Definition.*—**FILARIIDÆ** : mouth simple or with two insignificant lateral lips, not bounded by a chitinous peribuccal ring or by epaulette-like structures ; cuticle smooth or transversely striated ; without trident-like chitinous structures on each side of the anterior end of the œsophagus ; spicules unequal and dissimilar ; vulva in œsophageal region or just posterior to it.

KEY TO GENERA.

- Males without caudal alæ . . . . . 1  
 Males with caudal alæ . . . . . 5
1. With a definite buccal cavity or vestibule separating the œsophagus from the anterior extremity . . . . . 2  
 Without a buccal cavity or vestibule . . . . . 4
2. Male with ventral roughened callosity near tip of tail. Parasites of birds . . . . . Hamulofilaria, p. 398.  
 Male without ventral roughened callosity near tip of tail. Parasites of mammals . . . . . 3
3. Head papillæ absent ; longer spicule cylindrical proximally, ending in a long lash distally, gubernaculum absent ; vulva at level of posterior end of œsophagus . . . . . Litomosa, p. 398.  
 Head papillæ present ; longer spicule gradually tapering distally and shaped like a curved surgical needle, gubernaculum present ; vulva some distance behind end of œsophagus . . . . . Breinlia, p. 400.
4. Œsophagus not clearly divided into two parts ; anus not subterminal in either sex . . . . . Wuchereria, p. 401.  
 Œsophagus clearly divided into two parts ; anus subterminal in both sexes . . . . . Lemdana, p. 402.
5. Opisthodelphys . . . . . 6  
 Amphidelphys . . . . . 8
6. Anterior extremity with numerous cuticular papillæ . . . . . Parafilaria, p. 391.  
 Anterior extremity without numerous cuticular papillæ . . . . . 7
7. Mouth with lips ; vulva very near mouth ; caudal papillæ not unusually large . . . . . Filaria, p. 390.



- Mouth without lips ; vulva post-  
 cesophageal ; caudal papillæ very  
 large and stout . . . . . *Dirofilaria*, p. 393.
8. Mouth simple without lips . . . . . *Foleyella*, p. 395.
- Mouth with small projecting lateral  
 lips . . . . . 9
9. With a pair of lateral and four pairs  
 of submedian head papillæ ;  
 lateral flanges absent ; spicules  
 very delicate, the larger being  
 about ten times as long as the  
 smaller . . . . . *Hamatospiculum*, p. 395.
- With a pair of lateral and two pairs  
 of submedian head papillæ ; lateral  
 flanges present ; spicules both  
 relatively short, the larger being  
 about twice as long as the smaller  
 and winged about its mid-portion . . . . . *Politospiculum*, p. 396.

Genus **FILARIA** Mueller, 1787.

*Definition*.—**FILARIINÆ** : mouth with four small lips, two lateral and two median ; with lateral and submedian head papillæ ; cuticle smooth with lateral flanges along the whole length of the body ; cervical papillæ present. There is a short narrow vestibule separating the cesophagus from the mouth opening. Cesophagus indistinctly divided into a short anterior muscular, and a much longer posterior glandular part, and surrounded in its anterior part by the nerve ring. Male : posterior extremity rolled into loose spiral, tail elongate ; caudal alæ long and broad passing into the lateral alæ some distance in front of the cloaca and meeting one another posteriorly behind the tip of the tail ; cloaca surrounded by a delicate oval ring ; a number of shortly pedunculated pre- and post-anal papillæ present ; spicules very unequal and dissimilar, the right being small and the left large ; gubernaculum absent. Female : tail robust and digitiform ; anus minute, terminal portion of intestine atrophied ; vulva large, oval and subterminal, opening in the median ventral line immediately behind the mouth ; opisthodelphys. Oviparous, eggs at deposition contain fully-developed larvæ and have remarkably thick shells with the external surface shagreened. Parasites of subcutaneous tissue of carnivores and rodents.

Type species : *F. martis* Gmelin, 1790. ♂ 80 mm., ♀ 190–217 mm. In *Mustela* spp., *Hystrix* sp., *Ictonyx* sp.

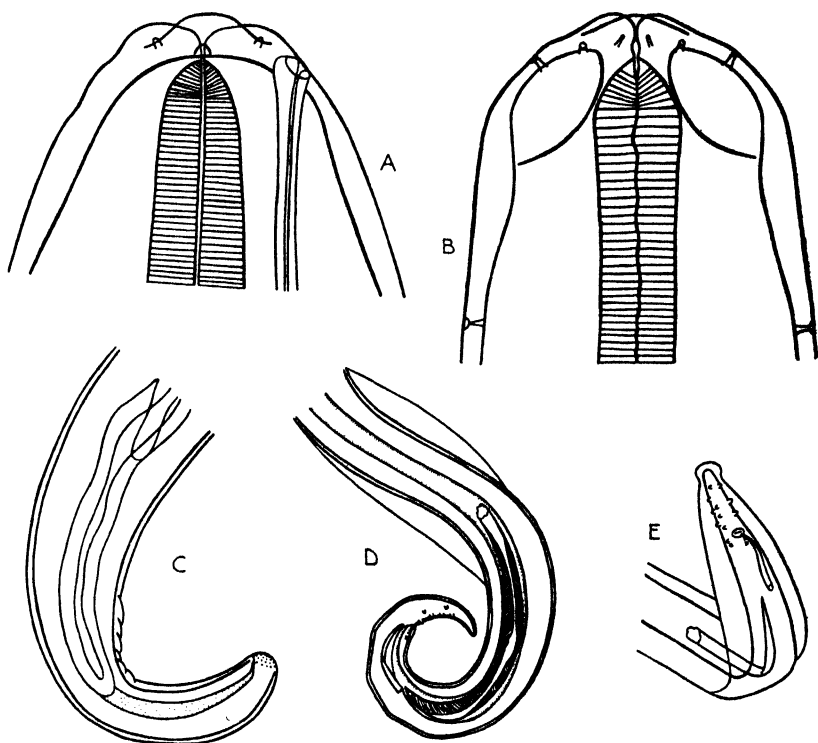


Fig. 265.—*Filaria martis*. A. Anterior extremity of female, lateral view.  $\times 250$ . B. Anterior extremity of male, ventral view.  $\times 250$ . C. Posterior extremity of female, lateral view.  $\times 56$ . D. Posterior extremity of male, lateral view.  $\times 56$ . E. Posterior extremity of male, ventral view.  $\times 56$ . (Orig.)

Syn., *Filaria mustelarum* Rud., 1809.

*Filaria quadrispina* Dies., 1851.

*Filaria perforans* Molin, 1858.

Refs. 123, 185, 205, 354, 362, 367, 480, 559.

#### Genus PARAFILARIA n. g.

**Definition.**—FILARIINÆ: mouth with two lateral lips; cuticle transversely striated except at the anterior extremity where it is covered with numerous elliptical and circular papillæ; œsophagus very short and not divided into two portions. Male: posterior extremity loosely coiled, tail short and bluntly rounded; caudal alæ present with large pedunculated pre- and post-anal papillæ; spicules very unequal; gubernaculum absent. Female: posterior extremity bluntly rounded; anus and posterior end of intestine atrophied; vulva very close to the mouth; opisthodelphys. Oviparous, eggs containing embryos. Parasites of equines.

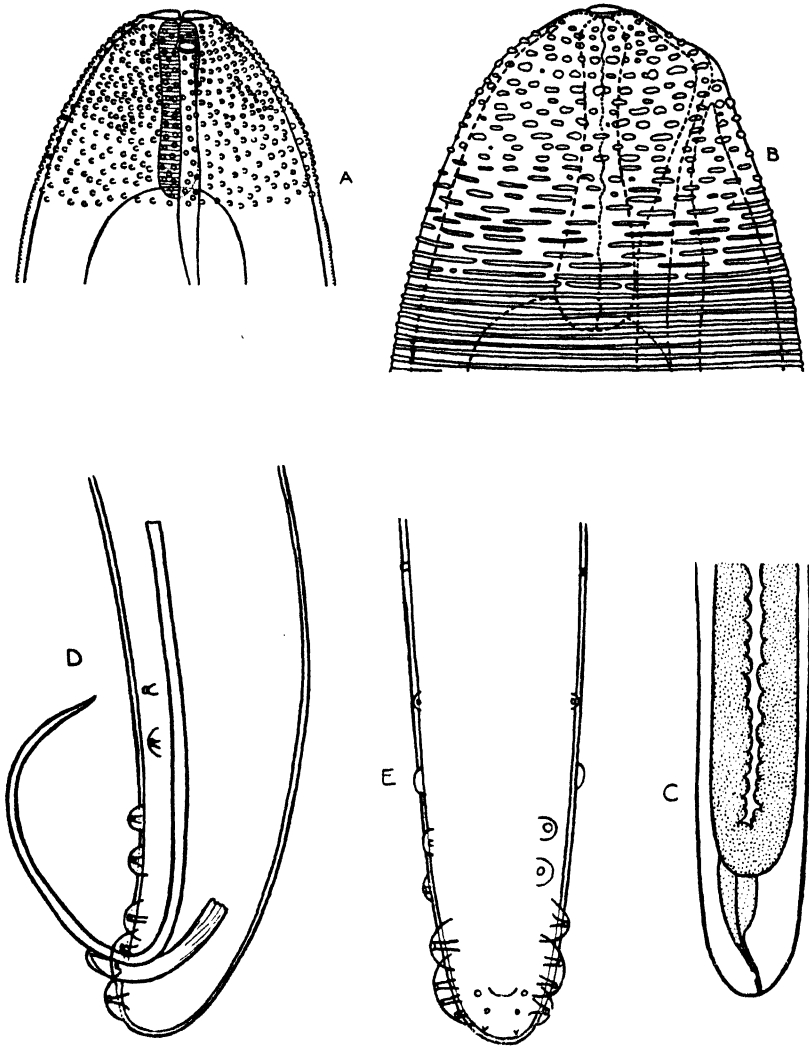


Fig. 266.—*Parafilaria multipapillosa*. A. Anterior extremity of female, ventral view.  $\times 128$ . B. Anterior extremity of female, lateral view.  $\times 216$ . C. Posterior extremity of female.  $\times 56$ . (Orig.) D. Posterior extremity of male, lateral view.  $\times 160$ . E. Posterior extremity of male, ventral view.  $\times 160$ . (After Railliet.)

Type species: *P. multipapillosa* (Condamine and Drouilly, 1878). ♂ 28 mm., ♀ 40–70 mm. In equines.

Syn., *Filaria multipapillosa* Condamine and Drouilly, 1878.

*Filaria hæmorrhagica* Railliet, 1885.

Refs. 110, 396, 398, 453.

Genus **DIROFILARIA** Railliet and Henry, 1911.

*Definition*.—**FILARIINÆ**: mouth without lips, with insignificant head papillæ; œsophagus relatively short and divided into two parts, but without a sharp line of demarcation. Male: posterior extremity spirally coiled, tail bluntly conical; caudal alæ present with very large pedunculated preanal papillæ and one or two large, and a number of small, postanal papillæ; spicules unequal;

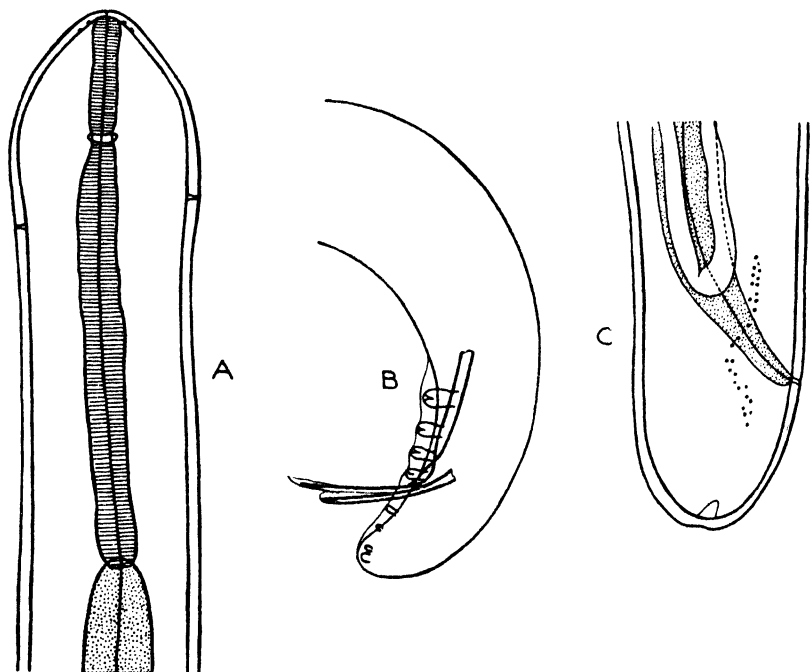


Fig. 267.—*Dirofilaria immitis*. A. Anterior extremity, ventral view.  $\times 52$ . B. Posterior extremity of male, lateral view.  $\times 100$ . C. Posterior extremity of female, lateral view.  $\times 52$ . (Orig.)

gubernaculum absent. Female: posterior extremity rounded; vulva a little behind the œsophagus; opisthodelphys. Viviparous, microfilariae unsheathed and found in the blood. Parasites in heart and connective tissue of primates, carnivora, rodents, and marsupials.

Type species: *D. immitis* (Leidy, 1856). ♂ 120–180 mm., ♀ 250–300 mm. In dogs.

Syn., *Filaria immitis* Leidy, 1856.

Other species:

*D. corynodes* (Linst., 1899). In monkeys.

- D. granulosa* (Linst., 1906). In *Felis pardus*.  
*D. kuelzi* (Rodenwaldt, 1910). In *Cephalophus maxwelli*.  
*D. magalhães*i (R. Blanchard, 1895). In man.  
*D. repens* Railliet and Henry, 1911. In dogs.  
*D. scapiceps* (Leidy, 1886). In *Sylvilagus* spp.  
*D. striata* (Molin, 1858). In *Felis concolor*, *Felis macroura*.

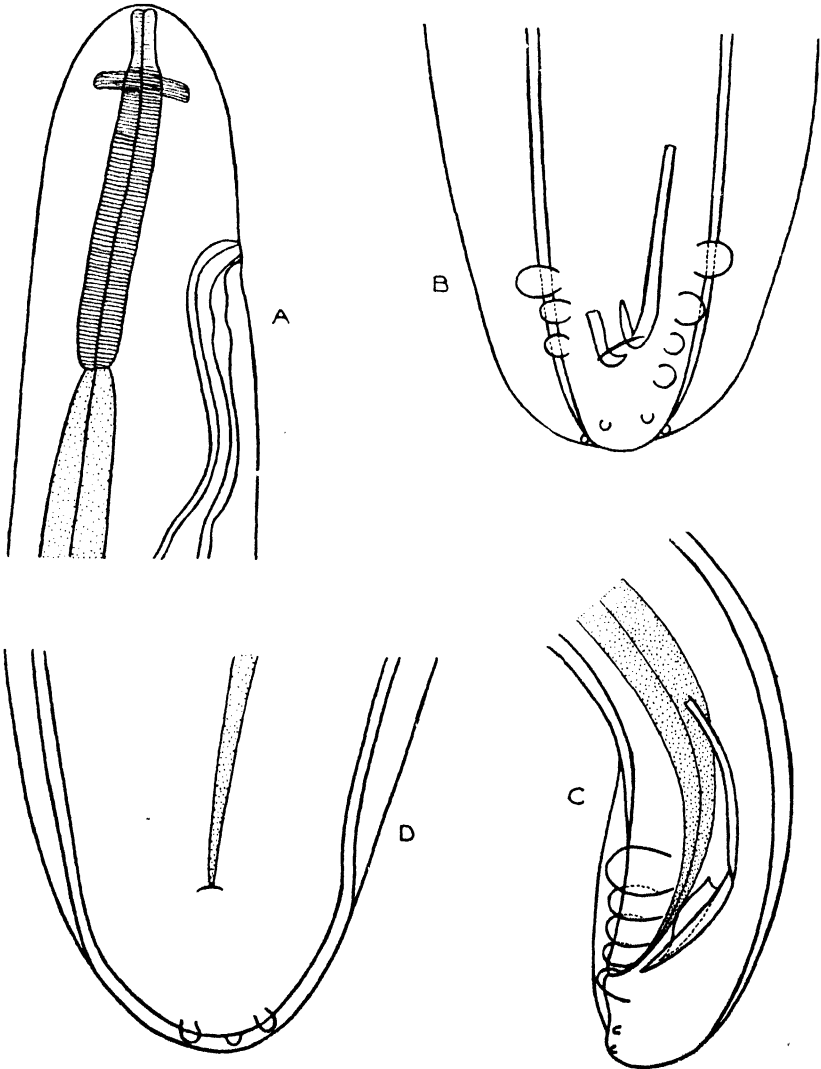


Fig. 268.—*Foleyella agamæ*. A. Anterior extremity of female, lateral view.  $\times 56$ . B. Posterior extremity of male, ventral view.  $\times 256$ . C. Posterior extremity of male, lateral view.  $\times 256$ . D. Posterior extremity of female, ventral view.  $\times 256$ . (Orig.)

*D. subcutanea* (Linstow, 1899). In *Erethizon dorsatus*.

*D. sudanensis* (Linstow, 1903). In *Felis leo*.

*D. websteri* (Cobbold, 1879). In *Macropus giganteus*.

Refs. 65, 141, 143, 205, 318, 428, 429, 469.

**Genus FOLEYELLA Seurat, 1917.**

*Definition*.—FILARIINÆ: mouth without lips, surrounded by a circle of six small head papillæ and four papillæ more externally; lateral areas broad and dark-coloured; cuticle with narrow lateral flanges running the whole length of the body; œsophagus very short and divided into two parts. Male: with long caudal alæ, pre- and post-anal papillæ shortly pedunculated and very large; spicules unequal, right short and broad. Female: vulva near the posterior end of the œsophagus; amphidelphys. Microfilaria sheathed and found in the blood. Parasites of subcutaneous connective tissue and muscular tissue of saurians and amphibians.

Type species: *F. candezei* (Fraipont, 1882). ♂ 25 mm., ♀ 69 mm. In *Uromastix acanthinurus*.

Syn., *Filaria candezei* Fraipont, 1882.

Other species:

*F. agamæ* (Rodhain, 1906). In *Agama colonorum*.

*F. chlamydosauri* (Breinl, 1913). In *Chlamydosaurus kingii*.

*F. duboisi* (Gedoelst, 1916). In a large toad.

? *F. leiperi* (Railliet, 1916). In *Bufo regularis*.

Syn., *Filaria bufonis* Leiper, 1908.

Refs. 58, 74, 151, 275, 406, 469a, 534, 544, 562.

**Genus HAMATOSPICULUM Skrjabin, 1916.**

*Definition*.—FILARIINÆ: mouth with two small projecting lateral lips, anterior extremity rounded, provided with four pairs of submedian head papillæ and a pair of lateral papillæ; cuticle finely striated transversely; lateral flanges absent; œsophagus consists of two parts, an anterior narrow portion, surrounded by the nerve ring, and a posterior broader part. Male: posterior extremity rounded, caudal alæ present with shortly pedunculated pre- and post-anal papillæ; spicules very unequal, the left being very delicate and barbed at its extremities and about ten times as long as the right, which is thicker. Female: vulva near the anterior extremity, shortly behind the first part of the œsophagus; amphidelphys. Oviparous. Parasites of the subcutaneous connective tissue of birds.

Type species: *H. brasilianum* (Stoss., 1897). ♂ 27 mm., ♀ 65–120 mm. In *Picus* sp.

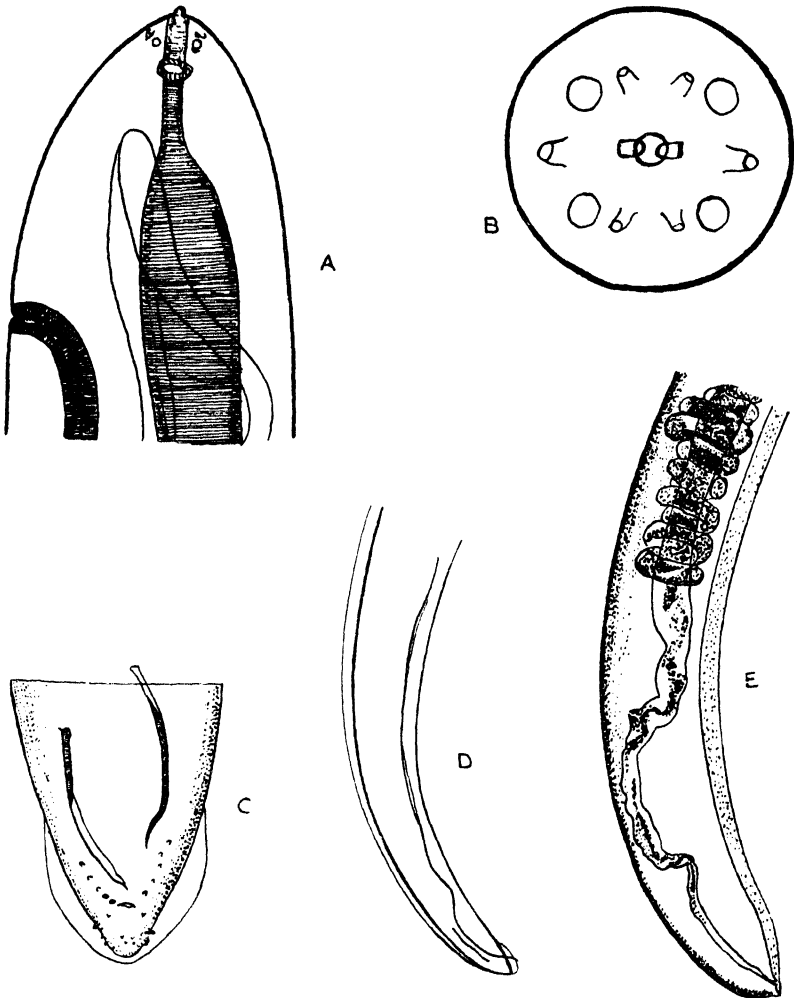


Fig. 269.—*Hamatospiculum brasilianum*. A. Anterior extremity of female, lateral view. B. Head, end-on view (diagram). C. Posterior extremity of male, ventral view. D. Posterior extremity of male, lateral view. E. Posterior extremity of female, lateral view. (After Skrjabin.)

Syn., *Filaria brasiliana* Stoss., 1897.

*Filaria insignis* Schneider, 1866, not Leidy, 1858.

Refs. 480, 574, 604.

Genus **POLITOSPICULUM** Skrjabin, 1916.

**Definition.**—**FILARIINÆ**: mouth with two small projecting lateral lips, anterior extremity rounded and provided with two pairs of submedian head papillæ and one pair of lateral papillæ ;

cuticle delicately striated transversely, with narrow lateral flanges along the whole length of the body; œsophagus consists of an anterior thin portion and a posterior thicker portion. Male: posterior extremity rounded, caudal alæ present meeting behind

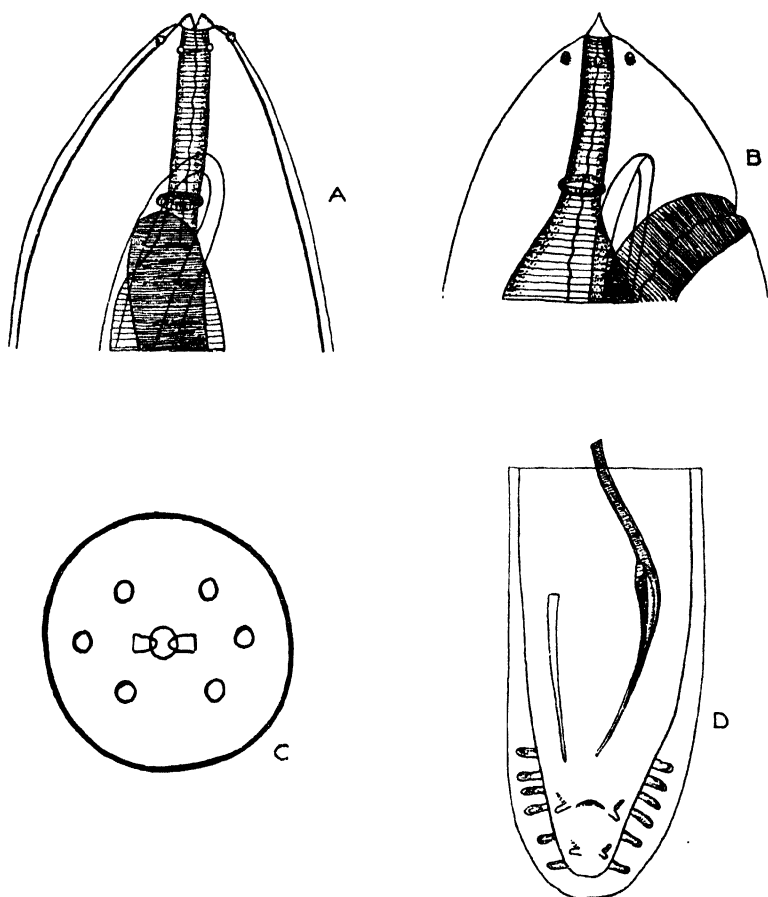


Fig. 270.—*Politospiculum arthricola*. A. Anterior extremity of female, ventral view. B. Anterior extremity of female, lateral view. C. Anterior extremity, end-on view (diagram). D. Posterior extremity of male, ventral view. (After Skrjabin.)

the tail and joining the lateral flanges anteriorly; with pedunculated pre- and post-anal papillæ; spicules short and unequal, the larger being bowed and provided with two dissimilar lateral wings in its middle portion. Female: vulva near the end of the first part of the œsophagus; amphidelphys. Oviparous, parasites of the joint cavities of birds.



Type species : *P. arthricola* Skrjabin, 1916. ♂ 75 mm., ♀ 225-300 mm. In *Alcedo* sp.

Ref. 574.

Genus **HAMULOFILARIA** Chandler, 1924.

**Definition.**—**FILARIINÆ**: mouth without lips, anterior extremity rounded with four head papillæ; small buccal cavity present, surrounded by a thickened wall resembling lips when seen in optical section. Male: posterior extremity bent ventrally and tapers to a sharp point; caudal alæ absent; near the tip of the tail is a roughened callosity; spicules unequal and dissimilar, the longer is slender and shaped like a surgical needle and is a closed tube up to a point not far from the tip, the shorter is trough-

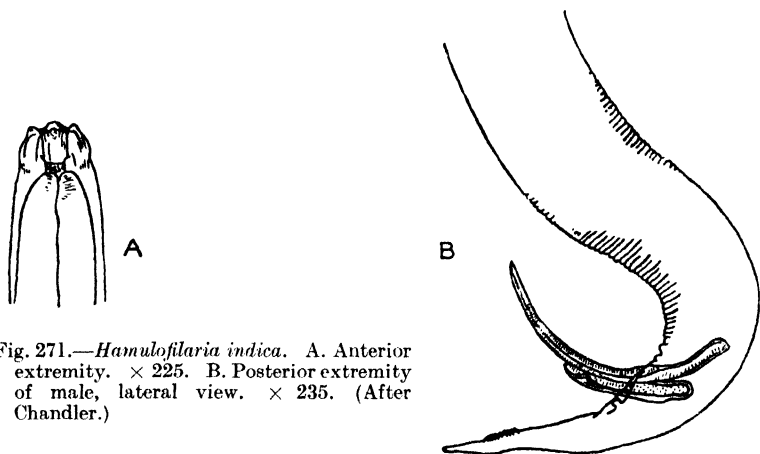


Fig. 271.—*Hamulofilaria indica*. A. Anterior extremity.  $\times 225$ . B. Posterior extremity of male, lateral view.  $\times 235$ . (After Chandler.)

shaped and barbed near its tip. Female: unknown. Parasites of mesentery of birds.

Type species : *H. indica* Chandler, 1924. ♂ 7.5 mm., ♀ ?. In *Cissa chinensis*.

Ref. 89.

Genus **LITOMOSA** n. g.

Syn., *Litosoma* van Beneden, 1873, preoccupied.

**Definition.**—**FILARIINÆ**: body attenuated posteriorly, anterior extremity somewhat enlarged; mouth simple without lips; head papillæ absent; small buccal cavity with thickened walls infundibular with apex anteriorly; cuticle smooth; œsophagus short and not divided into two parts. Male: posterior extremity coiled spirally, tail digitiform and furnished with a short sub-terminal point; caudal alæ absent; papillæ absent; spicules

very unequal, the longer being cylindrical proximally and ending in a long lash distally, the shorter thicker and of about the same diameter throughout. Female: tail digitiform and provided at its extremity with two small diverging processes between which

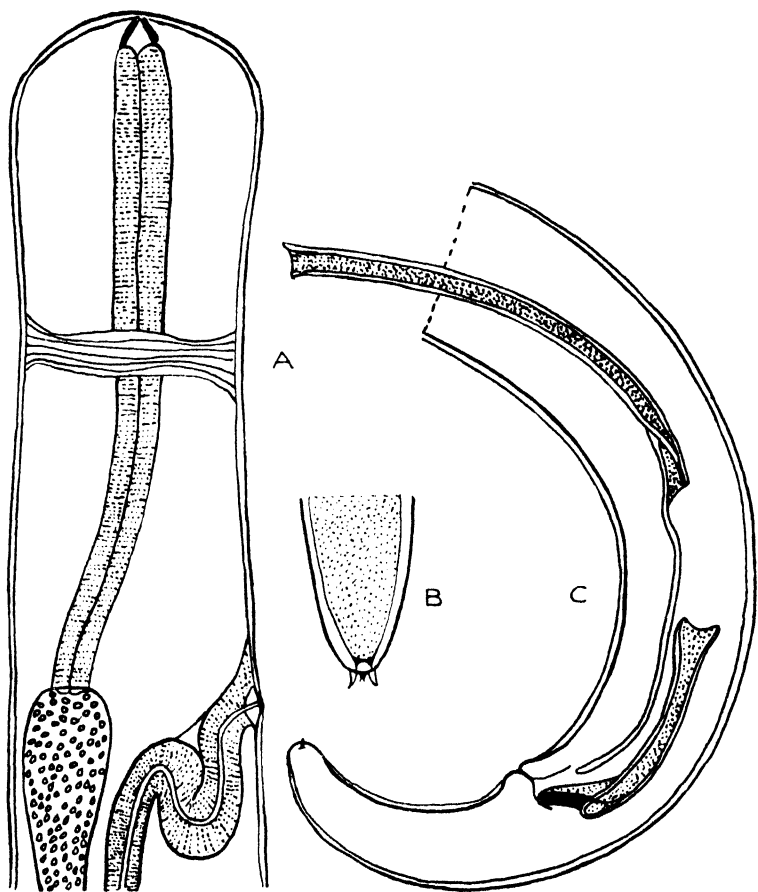


Fig. 272.—*Litomosa filaria*. A. Anterior extremity of female, lateral view. B. Posterior extremity of female, ventral view. C. Posterior extremity of male, lateral view.  $\times 360$ . (After Seurat.)

are two minute spines; vulva very small and situated at the level of the posterior end of the œsophagus; ovejector very long; uteri parallel; opisthodelphys. Viviparous, microfilariae very small. Parasites of abdominal cavity of bats.

Type species: *L. filaria* (Beneden, 1873). ♂ 17 mm., ♀ 26 mm. In *Vespertilio auritus*.

Syn., *Litosoma filaria* Beneden, 1873.

? *Filaria vespertilionis* Rud., 1819.

Refs. 51, 564.

Genus **BREINLIA** n. g.

*Definition*.—**FILARIINÆ**: body attenuated anteriorly; mouth simple without lips, with four pairs of submedian head papillæ;

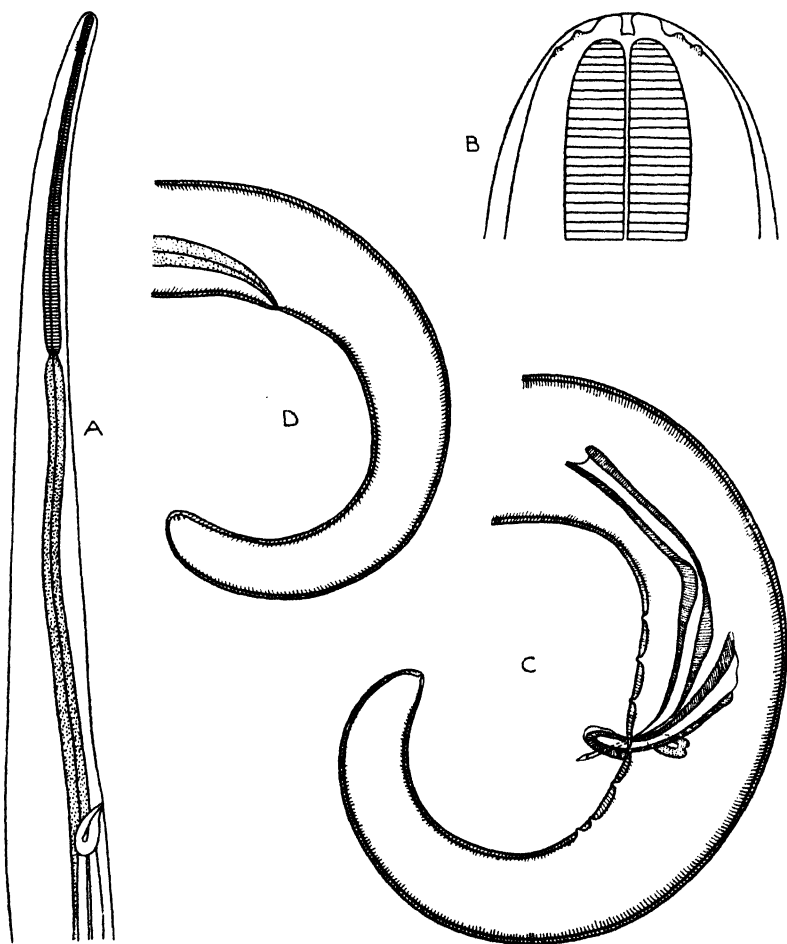


Fig. 273.—*Breinlia trichosuri*. A. Anterior extremity of female, lateral view.  $\times 24$ . B. Head, ventral view.  $\times 330$ . C. Posterior extremity of male, lateral view.  $\times 75$ . D. Posterior extremity of female, lateral view.  $\times 75$ . (Orig.)

with a short cylindrical buccal cavity; cuticle transversely striated; oesophagus divided into two parts, a shorter anterior

portion and a longer rather broader posterior portion, but without any very clear line of demarcation between the two parts. Male : posterior extremity coiled spirally, tail digitiform ; caudal alæ absent or extremely narrow ; with about three pairs of preanal and three of postanal papillæ ; spicules unequal, both stout and heavily chitinized, the longer cylindrical proximally, tapering distally and shaped like a curved surgical needle, the shorter cylindrical with a spatulate extremity in which the end of the longer spicule glides ; gubernaculum present. Female : posterior extremity digitiform with a pair of small subterminal papillæ on each side ; vulva some distance behind the termination of the œsophagus ; opisthodelphys. Viviparous ; the microfilariae are found in the blood. Parasites of marsupials.

Type species : *B. trichosuri* (Breinl, 1913). ♂ 10–14 mm., ♀ 18–36 mm. In *Trichosurus vulpecula*.

Syn., *Filaria trichosuri* Breinl, 1913.

Ref. 74.

Genus **WUCHERERIA** Silva Araujo, 1877 ; Seurat, 1921.

*Definition.*—**FILARIINÆ** : very delicate worms tapering anteriorly ; head definitely enlarged, rounded, and followed by a neck ; mouth circular without lips ; two circles of head papillæ ; cuticle smooth ; œsophagus of moderate length and, although not clearly divided into two portions, really consisting of two parts, the anterior muscular, narrow, short, and surrounded about its middle by the nerve ring, the posterior glandular, thicker, and longer. Male : posterior extremity sharply curved ventrally, tail digitiform ; caudal alæ present ; pre- and post-anal papillæ present ; spicules very unequal, the longer cylindrical, tapering distally to a long lash with delicate alæ, and ending in a spoon-like termination, the shorter spicule thicker and of uniform diameter throughout, gutter-like and coarsely marked near its distal extremity ; gubernaculum crescentic. Female : posterior extremity digitiform, prolonged some distance beyond the anus and bluntly rounded ; vulva slightly posterior to the middle of the œsophagus ; first portion of vagina short, thick, pyriform, and directed posteriorly, the second portion consists of a long cylindrical tube of uniform diameter running straight backwards to end in two parallel uteri ; opisthodelphys. Microfilariae sheathed and found in the blood. Parasites of mammals.

Type species : *W. bancrofti* (Cobbold, 1877). ♂ 25–40 mm., ♀ 76–100 mm. In man.

Syn., *Filaria bancrofti* Cobbold, 1877.

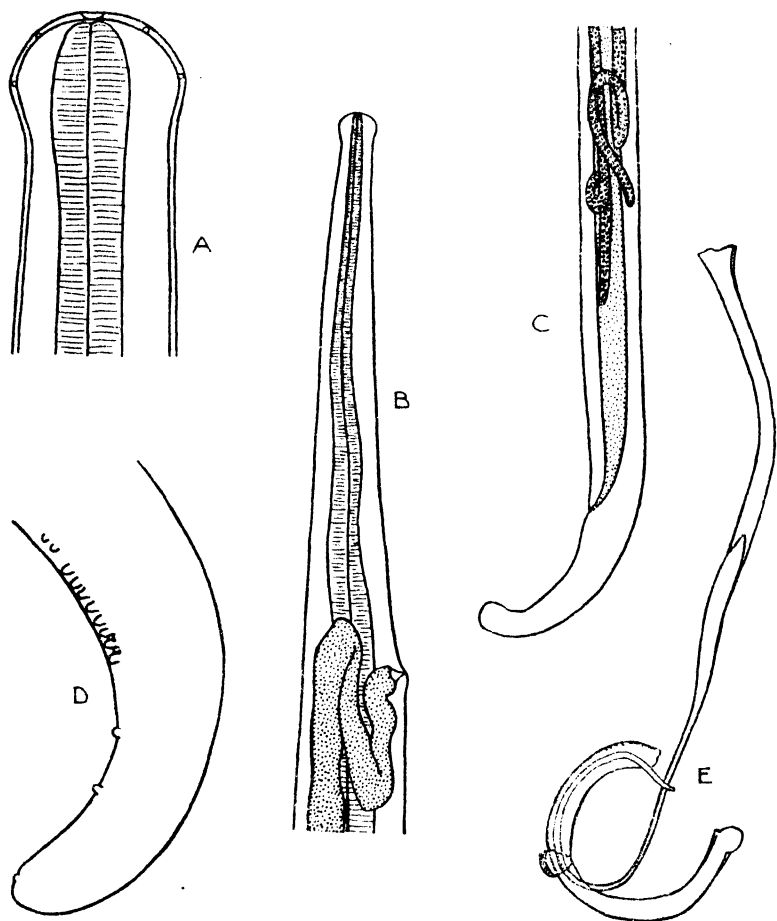


Fig. 274.—*Wuchereria bancrofti*. A. Anterior extremity, ventral view.  $\times 400$ . B. Anterior extremity of female, lateral view.  $\times 90$ . C. Posterior extremity of female, lateral view.  $\times 90$ . (Orig.) D. Posterior extremity of male, lateral view. E. spicules. (After Leiper.)

Other species : ? *W. sagitta* (Linstow, 1907). In *Tragelaphus scriptus*.

Syn., *Filaria sagitta* Linstow, 1907.

Refs. 102, 291, 329, 562, 571, 652a.

Genus **LEMDANA** Seurat, 1917.

**Definition.**—**FILARIINÆ**: mouth simple without lips, surrounded by very small head papillæ; body straight, slightly enlarged opposite the nerve ring, opalescent; cuticle thick and smooth, lateral areas narrow, lateral flanges absent; cervical

papillæ very small, behind the vulva in the female ; œsophagus short, consisting of two parts, the anterior muscular portion being clear and the posterior part darker. Male : posterior extremity

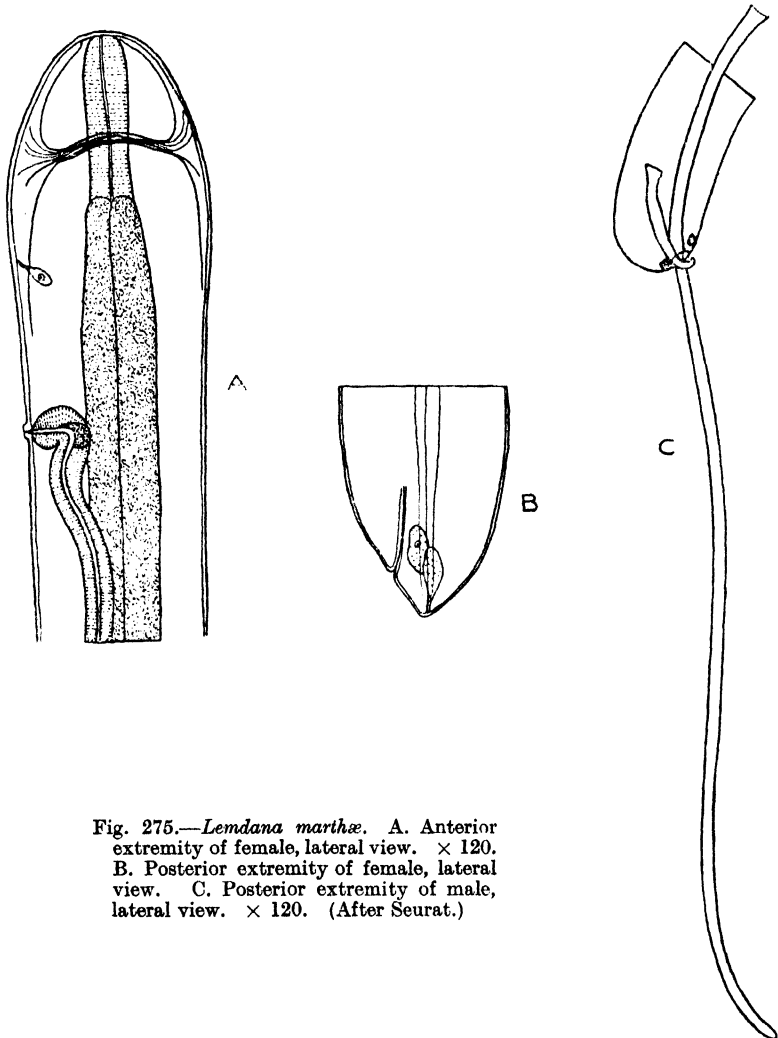


Fig. 275.—*Lemdana marthæ*. A. Anterior extremity of female, lateral view.  $\times 120$ . B. Posterior extremity of female, lateral view. C. Posterior extremity of male, lateral view.  $\times 120$ . (After Seurat.)

slightly bowed, tail very short and sharply truncate just behind the anus ; caudal alæ absent ; four large circumanal and two postanal papillæ ; spicules very unequal. Female : tail very short, conical, and bearing three small terminal subventral papillæ ; vulva behind the first part of the œsophagus ; opisthodelphys.

Microfilariae unsheathed and found in the blood. Parasites of the external surface of the crop of birds.

Type species : *L. marthæ* Seurat, 1917. ♂ 12.8 mm., ♀ 34 mm. In rock partridge.

Refs. 543, 562.

#### Subfamily APROCTINÆ n.sf.

*Definition.*—FILARIIDÆ: mouth simple, not bounded by a peribuccal chitinous ring or epaulette-like structures; cuticle smooth or transversely striated; without trident-like structures on each side of the anterior end of the œsophagus; spicules equal or subequal and similar; vulva in the œsophageal region or just posterior to it.

#### KEY TO GENERA.

1. Males with caudal alæ . . . . . Pelecitus, p. 411.  
Males without caudal alæ . . . . . 2
2. Amphidelphys . . . . . 3  
Opisthodelphys . . . . . 4
3. Mouth surrounded by a cuticular collar . Coronofilaria, p. 409.  
Mouth simple without a cuticular collar Chandlerella, p. 411.
4. Œsophagus very narrow and transparent . . . . . Eufilaria, p. 406.  
Œsophagus of the ordinary type . . . . . 5
5. Posterior extremity of both sexes digitiform and prolonged considerably beyond the anus . . . . . Thamugadia, p. 407.  
Posterior extremity of both sexes terminates immediately behind the anus . 6
6. Œsophagus clearly divided into two parts, the second being much wider and longer than the first. . . . . Saurositus, p. 407.  
Œsophagus not clearly divided into two parts . . . . . Aprocta, p. 404.

Genus APROCTA Linstow, 1883.

Syn., *Lissonema* Linstow, 1903.

*Definition.* — APROCTINÆ: anterior extremity slightly attenuated; extremities of body rounded; mouth simple, usually not surrounded by lips or papillæ, or rarely with three insignificant flat lips; without a definite mouth cavity or vestibule; cuticle with fine longitudinal striations; œsophagus simple and short;

posterior end of the gut and anus atrophied or absent. Male: without caudal alæ, papillæ usually absent, but occasionally one or two postanal papillæ; spicules short and subequal. Female: vulva in the œsophageal region; opisthodelphys. Oviparous, eggs small, thick-shelled and containing embryos at deposition. Parasites of orbital and nasal cavities of birds.

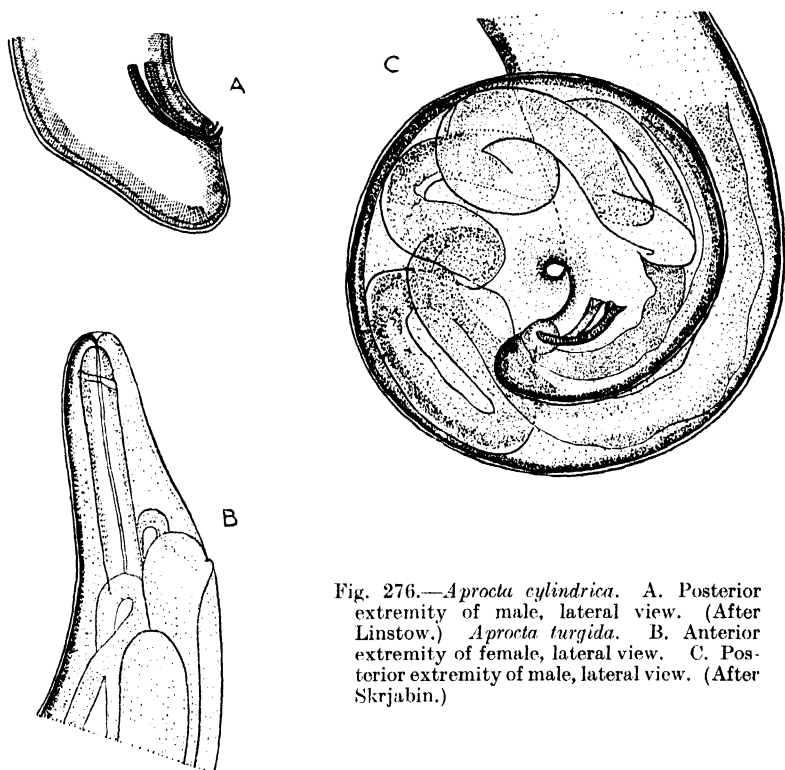


Fig. 276.—*Aprocta cylindrical*. A. Posterior extremity of male, lateral view. (After Linstow.) *Aprocta turgida*. B. Anterior extremity of female, lateral view. C. Posterior extremity of male, lateral view. (After Skrjabin.)

Type species: *A. cylindrical* Linstow, 1883. ♂ 16 mm., ♀ 27 mm.  
In *Petræca cyanea*.

Other species:

- A. ærophila* (Linstow, 1906). In *Phœnicopterus roseus*.
- A. anthicola* (Linstow, 1903). In *Anthus richardi*.
- A. crassa* Railliet and Henry, 1910. In *Otis tarda*.
- A. matronensis* Railliet and Henry, 1910. In *Corvus cornix*.
- ? *A. mavis* (Leiper, 1909). In *Turdus musicus*.
- A. microanalís* Skrjabin, 1917. In *Erithacus* sp.
- A. narium* Linstow, 1901. In *Buteo* sp.
- A. ophthalmophaga* Stossich, 1902. In *Falco* sp.



*A. orbitalis* Linstow, 1901. In *Falco fuscoater*.

*A. rotundata* (Linstow, 1903). In *Centropus sinensis*.

Syn., *Lissonema rotundatum* Linstow, 1903.

*A. turgida* Stossich, 1902. In *Larus argentatus*.

Refs. 278, 313, 324, 424, 577, 578.

Genus **EUFILARIA** Seurat, 1921.

*Definition*.—**APROCTINÆ**: mouth simple without lips or head papillæ; body turgescient, rounded at the extremities; cuticle

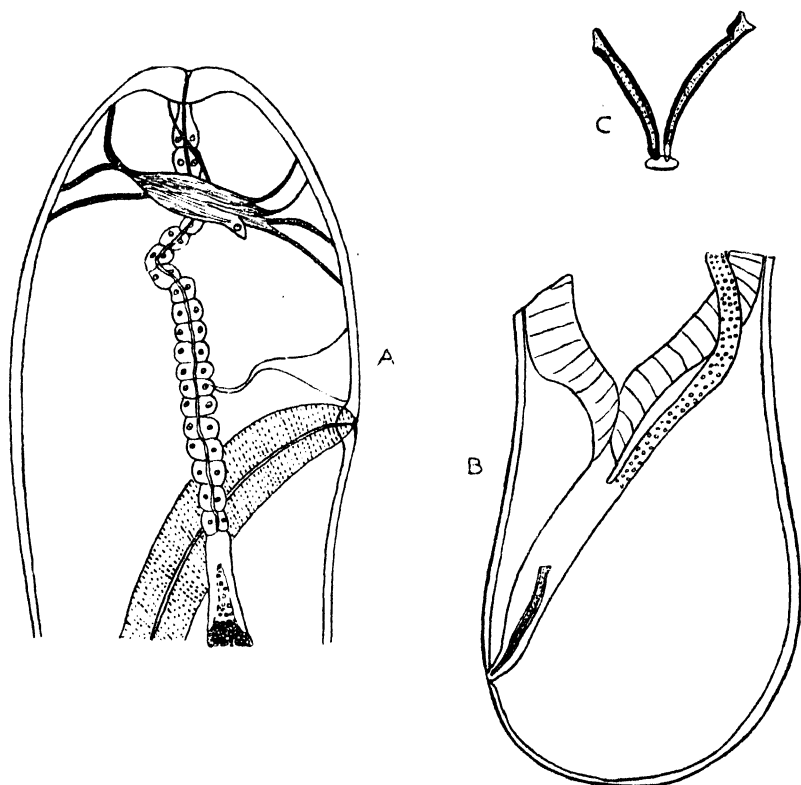


Fig. 277.—*Eufilaria sergenti*. A. Anterior extremity of female, lateral view. B. Posterior extremity of male, lateral view. C. Spicules. (After Seurat.)

smooth, lateral areas very broad; vestibule narrow and short; oesophagus short, very narrow, and transparent, and not divided into two parts. Male: straight with very short, rounded tail; no caudal alæ or papillæ; cloaca very small; spicules short, subequal, and acicular. Female: with short, massive, rounded

tail; vulva in the œsophageal region; opisthodelphys. Oviparous, eggs with a thin shell, hatching in utero. Microfilariae unsheathed. Parasites of subcutaneous tissue of Passeriformes.

Type species: *E. sergenti* Seurat, 1921. ♂ 3.3 mm., ♀ 14 mm. In *Passer hispaniolensis*.

Other species: *E. capsulata* (Annett, Dutton, and Elliott, 1901). In *Pycnonotus barbatus*, *Sitagra* sp. *Hyphantornis* sp.

Syn., *Filaria capsulata*  
Annett, Dutton,  
and Elliott, 1901.

Refs. 4, 561, 562.

Genus **THAMUGADIA** Seurat, 1917.

*Definition.*—**APROCTINÆ**: mouth simple without lips; with six small head papillæ; cuticle smooth, lateral areas narrow and not distinguished from the rest of the skin; œsophagus short and not divided. Tails of both sexes relatively long and digitiform. Male: caudal alæ and genital papillæ absent; spicules short and equal. Female: vulva slightly posterior to the œsophagus; opisthodelphys. Microfilariae sheathed and found in the blood. Parasites of the subcutaneous connective tissue of the thoracic region of geckos.

Type species: *T. hyalina* Seurat, 1917. ♂ 9 mm., ♀ 11 mm. In *Tarentola mauritanica*.

Refs. 544, 562.

Genus **SAUROSITUS** Macle, 1924.

*Definition.*—**APROCTINÆ**: mouth simple without lips, with two lateral and four submedian head papillæ; cuticle smooth; œsophagus short and clearly divided into two portions, a short narrow anterior part and a much longer and broader posterior portion; posterior end of the gut and anus, which is subterminal, atrophied in both sexes. Male: posterior extremity coiled into a loose spiral; caudal alæ absent with a few preanal papillæ; spicules subequal; gubernaculum present. Female: posterior extremity somewhat attenuated and ending in two more or less

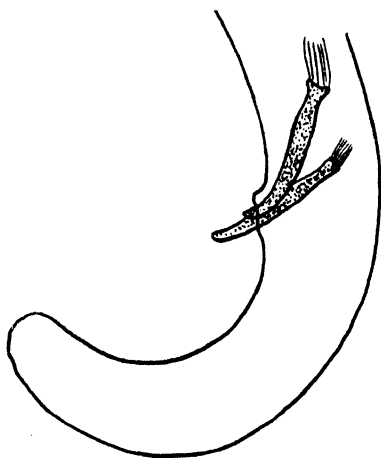


Fig. 278.—*Thamugadia hyalina*. Posterior extremity of male, lateral view. (After Seurat.)

distinct lobes ; vulva just posterior to the end of the œsophagus ; opisthodelphys. Ovoviviparous, embryos sheathed and found in the blood. Parasites of reptiles.

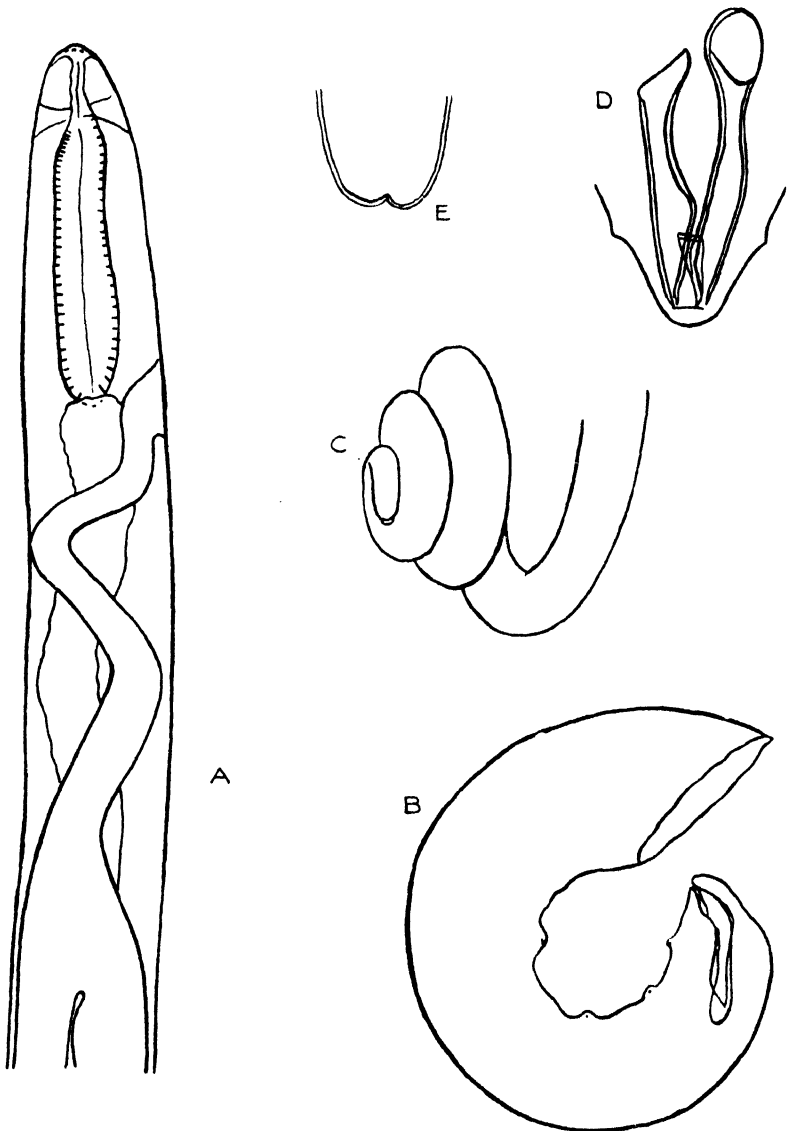


Fig. 279.—*Saurosis agamæ*. A. Anterior extremity of female, lateral view.  $\times 45$ . B. Posterior extremity of male, lateral view.  $\times 150$ . C. Posterior extremity of male.  $\times 60$ . D. Posterior extremity of male, ventral view, showing spicules.  $\times 300$ . E. Posterior extremity of female, ventral view.  $\times 150$ . (After Macfie.)

Type species: *S. agamæ* Macfie, 1924. ♂ 42–45 mm., ♀ 80–140 mm. In *Agama colonorum*.

Ref. 345.

Genus **CORONOFILARIA** n.g.

Syn., ? *Eucamptus* Duj., 1845, preoccupied.

*Definition.* — **APROCTINÆ**: tapering slightly towards the extremities; mouth surrounded by a cuticular collar; with four

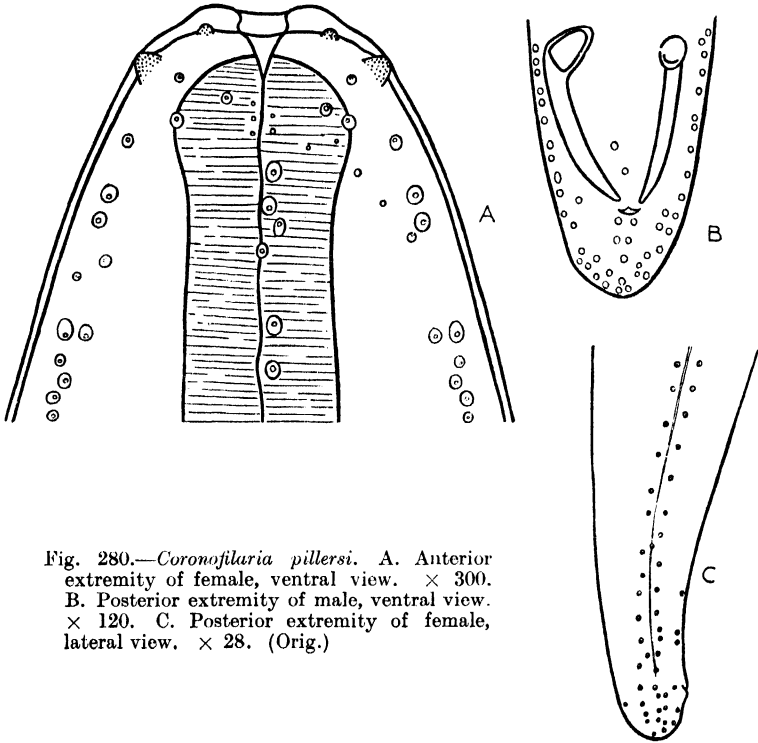


Fig. 280.—*Coronofilaria pillersi*. A. Anterior extremity of female, ventral view.  $\times 300$ . B. Posterior extremity of male, ventral view.  $\times 120$ . C. Posterior extremity of female, lateral view.  $\times 28$ . (Orig.)

pairs of submedian head papillæ; mouth cavity small, but distinct and infundibular; cuticle finely transversely striated with small insignificant papillæ scattered irregularly, especially about the middle portion of the worm. In the type species along the lateral areas for the whole length of the worm are two rows of small oval pigmented corpuscles; the corpuscles are found also on the ventral and dorsal surfaces at the extremities of the worm; œsophagus relatively narrow and short, cylindrical and not divided into two portions. Male: posterior extremity coiled spirally. tail short and rounded; caudal alæ absent; spicules

subequal, short, and stout; about two pairs of preanal papillæ. Female: posterior extremity straight, short, and rounded; vulva in the œsophageal region; amphidelphys. Oviparous. Parasites of subcutaneous tissue of birds.

Type species: \**C. pillersi* n.sp. ♂ 16 mm., ♀ 32 mm. In blue warbler flycatchers.

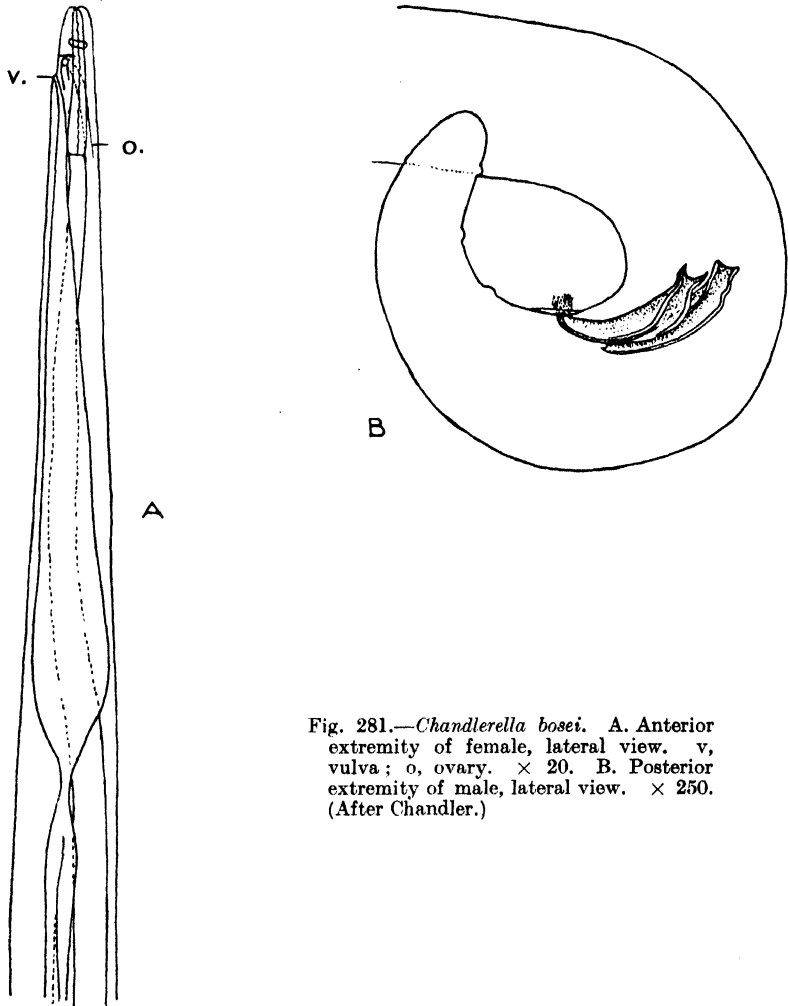


Fig. 281.—*Chandlerella bosei*. A. Anterior extremity of female, lateral view. v, vulva; o, ovary.  $\times 20$ . B. Posterior extremity of male, lateral view.  $\times 250$ . (After Chandler.)

\* *Coronofilaria pillersi* n.sp. Length of male about 16 mm., female about 32 mm. Œsophagus in the male about 680–700  $\mu$  in length, and in the female about 830–880  $\mu$ . Spicules about 180–200  $\mu$  in length. Vulva about 630–640  $\mu$  from the anterior extremity, and the anus in the female is about 100  $\mu$  from the tip of the tail. Cuticle with two rows of oval pigmented corpuscles along the lateral lines and with a few similar corpuscles on the ventral and dorsal surfaces at the extremities.

Other species :

*C. coronata* (Rud., 1809). In *Coracias garrula*.

Syn., \**Filaria coronata* Rud., 1809.

? *C. obtusus* (Duj., 1845). In *Caprimulgus europæus*.

Syn., *Eucamptus obtusus* Duj., 1845.

Refs. 131, 313, 321, 476, 479a, 578.

**Genus CHANDLERELLA n.g.**

*Definition*.—APROCTINÆ : mouth simple without lips ; without head papillæ ; cuticle smooth ; œsophagus stout, short, and not divided into two parts. Male : posterior extremity extremely coiled, tail digitiform ; caudal alæ absent, with three pairs of inconspicuous postanal papillæ ; spicules equal, stout, and trough-like. Female : tail short and rounded ; vulva in the œsophageal region ; amphidelphys. Microfilariae found in the blood. Parasites of birds.

Type species : *C. bosei* (Chandler, 1924). ♂ 9–11 mm., ♀ 28 mm. In *Dissemurus paradiseus*.

Syn., *Filaria bosei* Chandler, 1924.

Ref. 89.

**Genus PELECITUS Railliet and Henry, 1910.**

*Definition*.—APROCTINÆ : mouth simple without lips ; anterior extremity rounded, provided with a pair of lateral and two to four pairs of submedian head papillæ ; cuticle with fine longitudinal striations and lateral flanges along the whole body ; œsophagus narrow, cylindrical, and not divided into two parts. Male : tail truncate ; caudal alæ large ; preanal papillæ sometimes absent, but there may be two to four pairs ; postanal papillæ variable in number ; spicules equal or subequal † and very short and delicate. Female : tail with one or two pairs of pedunculated papillæ ; vulva near the anterior extremity. Oviparous, eggs oval. Parasites of muscles and tendons of the legs of birds.

Type species : *P. helycinus* (Molin, 1860). ♂ 4 mm., ♀ 5–16 mm. In *Alcedo americana*, *Ampelis* sp., *Anabates* spp., *Corvus* spp., etc.

Syn., *Spiroptera helicina* Molin, 1860.

Other species :

*P. calamiformis* (Schneider, 1866). In *Psittacus æstivus*.

\* In a paper published whilst this volume was in the press, Schmerling (1925) has erected a new genus *Squamofilaria* for *Filaria coronata* Rudolphi, 1809. Our genus *Coronofilaria* will hence probably fall as a synonym.

† Drasche, 1883, states that *P. helycinus*, *P. circularis*, and *P. serpentulus*, all have very short and almost equal spicules, whereas Skrjabin, 1916, states that in *P. tercostatus* the left spicule is .136 mm. and the right .085 mm.

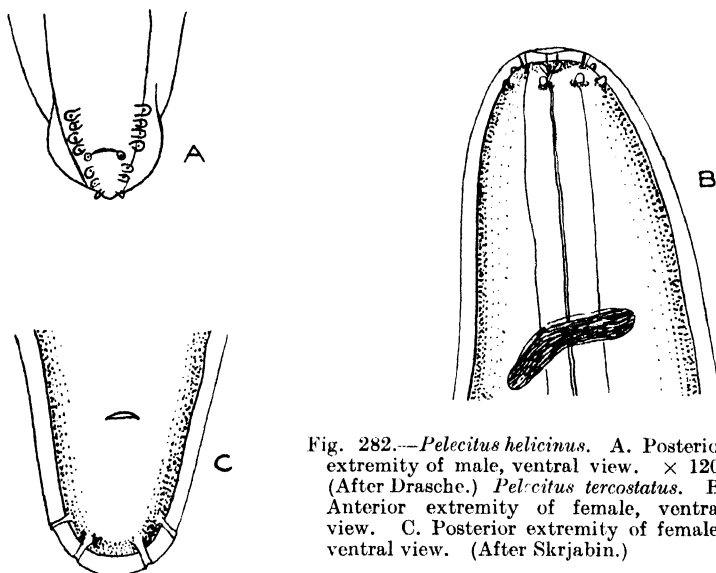


Fig. 282.—*Pelecitus helacinus*. A. Posterior extremity of male, ventral view.  $\times 120$ . (After Drasche.) *Pelecitus tercostatus*. B. Anterior extremity of female, ventral view. C. Posterior extremity of female, ventral view. (After Skrjabin.)

*P. circularis* (Molin, 1860). In *Corvus* spp. and *Psittacus* spp.

*P. quadripapillosus* (Molin, 1860). In *Ajaja ajaja*.

*P. serpentulus* (Dies., 1851). In *Falco* spp.

*P. tercostatus* (Molin, 1860). In *Psittacus* spp.

Refs. 128, 358, 422, 574.

#### Subfamily ONCHOCERCINÆ Leiper, 1911.

*Definition*.—FILARIOIDÆ: mouth simple without a chitinous peribuccal ring or lateral epaulette-like structures; without trident-like chitinous structures on each side of the anterior end of the œsophagus; cuticle reinforced by external or internal annular thickenings; spicules unequal; vulva in the œsophageal region.

#### KEY TO GENERA.

1. Anterior portion of female much thinner than remainder, which is swollen . . . . . *Elæophora*, p. 414.  
     Posterior part of female not thickened . . . . . 2
2. Cuticular thickenings annular . . . . . *Onchocerca*, p. 413.  
     Cuticular thickenings short and fusiform . . . . . *Katanga*, p. 416.

Genus *ONCHOCERCA* Diesing, 1841.

*Definition.*—*ONCHOCERCINÆ*: both sexes filiform, the female not being swollen posteriorly; mouth simple and not surrounded

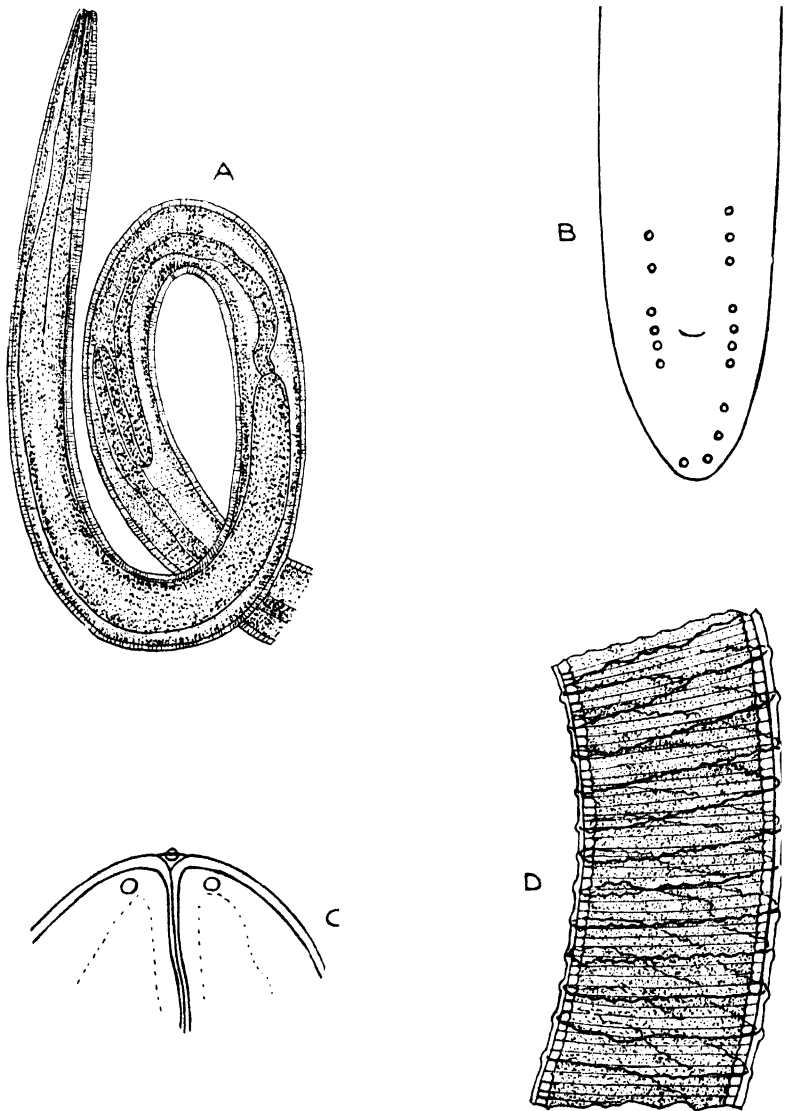


Fig. 283.—*Onchocerca reticulata*. A. Anterior extremity of female. (After Pader.) B. Posterior extremity of male, ventral view (diagram). (Orig.) *Onchocerca gibsoni*. C. Anterior extremity of female. (After Gilruth and Sweet.) *Onchocerca cervicalis*. D. Portion of body showing cuticular striations and thickenings. (After Railliet.)



by lips or papillæ (or if these are present they are extremely minute); cuticle, always in the female, especially towards the middle of the body, and sometimes in the male, thick, transversely striated, and reinforced externally by spiral thickenings which are often interrupted in the lateral fields; œsophagus relatively short and not clearly divided into two portions. Male: posterior extremity spirally coiled; caudal alæ usually absent (except in *O. armillata*), four circumanal papillæ, and also one or more papillæ in front of and behind these; spicules unequal. Female: vulva in the anterior œsophageal region; opisthodelphys. Microfilariae unsheathed. Parasites of ligaments, vessels, intramuscular connective tissue, and subcutaneous connective tissue of mammals.

Type species: *O. reticulata* Diesing, 1841. ♂ 270 mm., ♀ 700–800 mm. In horse.

Syn., *Filaria reticulata* (Dies., 1841) Creplin, 1846.

*Spiroptera reticulata* Dies., 1841, Railliet, 1885, in part.

*Spiroptera cincinnata* Ercolani, 1866.

Other species:

*O. armillata* Railliet and Henry, 1909. In cattle, buffalo.

*O. bovis* Piettre, 1912. In *Bos taurus*.

*O. cæcutiens* Brumpt, 1919. In man.

? *O. capræ* (Linstow, 1883). In goats.

*O. cervicalis* Railliet and Henry, 1910. In horse.

Syn., *Spiroptera reticulata* Diesing, 1841, Railliet, 1885, in part.

*O. fasciata* Railliet and Henry, 1910. In dromedary.

? *O. flexuosa* (Wedl, 1856). In Cervidæ.

*O. gibsoni* Cleland and Johnston, 1910. In cattle.

*O. gutturosa* Neumann, 1910. In cattle.

*O. indica* Sweet, 1915. In *Bos bubalis* and *Bos indicus*.

? *O. lienalis* (Stiles, 1892). In cattle.

? *O. spiralis* (Molin, 1860). In *Bradypus didactylus*.

*O. volvulus* (Leuckart, 1893). In man.

Refs. 52, 77a, 86a, 109, 140, 183, 184, 285, 289, 305, 385, 422, 434, 608.

Genus **ELÆOPHORA** Railliet and Henry, 1912.

*Definition*.—ONCHOCERCINÆ: males and the anterior part of the females, which are embedded in the aortic tissue, are filiform, the main portion of the females, which is free in the lumen of the vessel, is much thicker; mouth simple without lips; cuticle in the male and in the anterior portion of the female is transversely striated, in the remaining portion of the female it is much thicker

and smooth, but at a deeper level it exhibits marked annulations giving the appearance of an internal striation; œsophagus cylindrical and very long; intestine very narrow but not

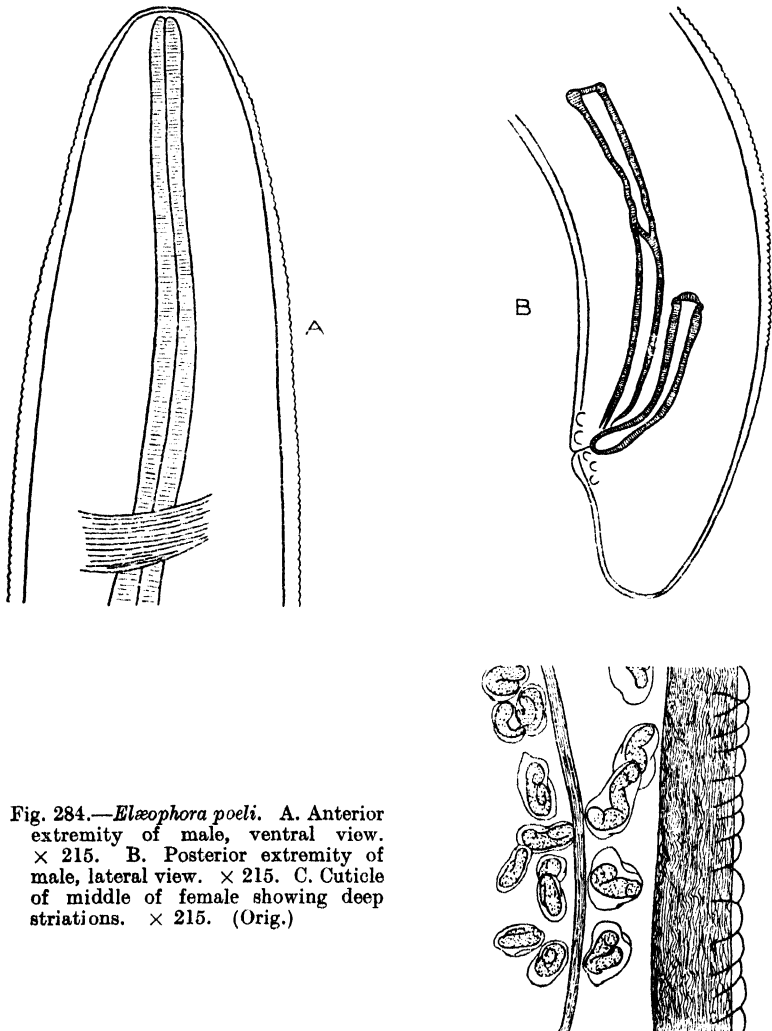


Fig. 284.—*Elæophora poeli*. A. Anterior extremity of male, ventral view.  $\times 215$ . B. Posterior extremity of male, lateral view.  $\times 215$ . C. Cuticle of middle of female showing deep striations.  $\times 215$ . (Orig.)

atrophied. Male: posterior extremity bent ventrally; caudal alæ absent; two pairs of preanal, and three of postanal, small sessile papillæ; spicules unequal. Female: diameter of the posterior portion five or six times that of the anterior part; vulva in the œsophageal region; uterus divides into four parallel

branches ; four ovaries. Microfilariae unsheathed. Parasites of the aorta of ruminants.

Type species : *E. poeli* (Vryburg, 1897). ♂ 45–70 mm., ♀ about 200 mm. In the ox.

Syn., *Filaria poeli* Vryburg, 1897.

Refs. 52, 434.

Genus **KATANGA** n.g.

Syn., *Grammophora* Geddoelst, 1916, preoccupied.

*Definition*.—ONCHOCERCINÆ : mouth small and round without lips ; head with four very small submedian papillae ; cuticle in

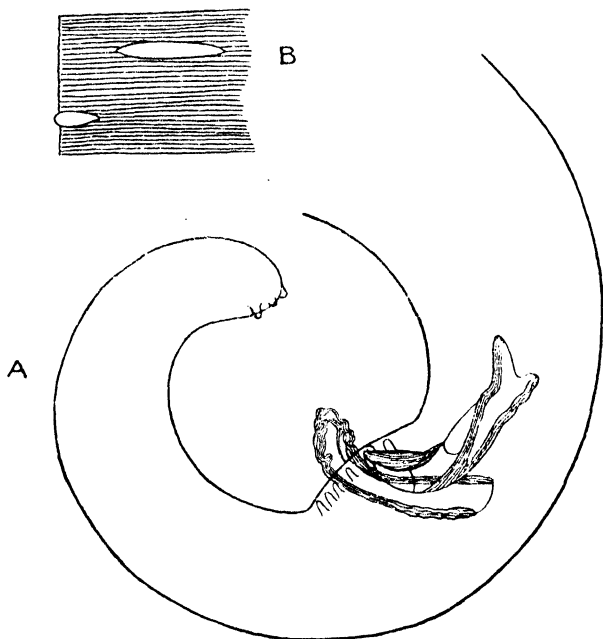


Fig. 285.—*Katanga katangensis*. A. Posterior extremity of male, lateral view. B. Portion of body wall showing fusiform thickenings. (After Geddoelst.)

both sexes with fine transverse superficial striations and with fusiform thickenings distributed irregularly between them ; lateral flanges absent ; oesophagus divided into two parts, the first narrow and short and the second much broader and longer. Male : posterior extremity spirally coiled ; caudal alae absent, a group of six para-anal papillae and a pair of subterminal papillae ; spicules short and subequal. Female : posterior extremity bent ventrally ;

vulva near the anterior extremity. Microfilariae unsheathed and found in the blood. Parasites of intramuscular connective tissue of mammals.

Type species : *K. katangensis* (Gedoelst, 1916). ♂ 34–39 mm., ♀ 57–65 mm. In *Petrodromus tetradactylus*.

Syn., *Grammophora katangensis* Gedoelst, 1916.

Ref. 151.

### Subfamily LOAINÆ n. sf.

*Definition*.—FILARIIDÆ : mouth simple without a chitinous peribuccal ring or epaulette-like structures ; without trident-like chitinous structures on each side of the anterior end of the œsophagus ; cuticle furnished with bosses ; spicules equal or unequal ; vulva in the œsophageal region or slightly posterior to it.

### KEY TO GENERA.

1. Spicules unequal and dissimilar . . . . . *Loa*, p. 417.  
     Spicules subequal and similar . . . . . 2
2. With preanal papillæ ; parasites of  
     mammals . . . . . *Micipsella*, p. 418.  
     Without preanal papillæ ; parasites of  
     birds . . . . . *Splendidofilaria*, p. 420.

### Genus *LOA* Stiles, 1905.

*Definition*.—LOAINÆ : mouth simple without lips ; with two lateral and four small submedian head papillæ ; cuticle thick, not striated, but ornamented with small bosses, except at the anterior extremities of both sexes and at the tail of the male, which are smooth ; œsophagus short and divided into two parts. Male : tail bent spirally ; caudal alæ absent ; with five pairs of large pedunculated papillæ and a number of small sessile papillæ ; spicules unequal. Female : posterior extremity rounded with a pair of papillæ near the tip of the tail ; vulva behind the œsophagus ; amphidelphys. Microfilariae sheathed and found in the blood. Parasites of mammals.

Type species : *L. loa* (Guyot, 1778). ♂ 25–35 mm., ♀ 45–63 mm. In man.

Syn., *Filaria loa* Guyot, 1778.

Refs. 291, 339, 599.

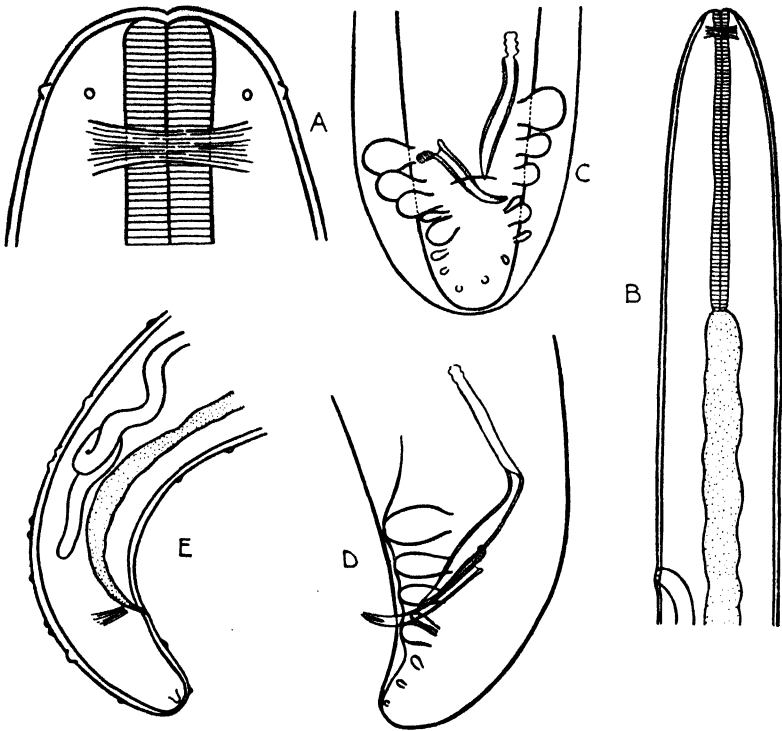


Fig. 286.—*Loa loa*. A. Head, ventral view.  $\times 180$ . B. Anterior extremity, lateral view.  $\times 32$ . C. Posterior extremity of male, ventral view.  $\times 180$ . D. Posterior extremity of male, lateral view.  $\times 180$ . E. Posterior extremity of female, lateral view.  $\times 64$ . (Orig.)

Genus **MICIPSELLA** Seurat, 1921.

Syn., *Cercofilaria* Kalantarian, 1924.

**Definition.**—**LOAINÆ**: mouth simple without lips and on the summit of a little hemispherical projection which carries a circle of very small papillæ; in addition, there are four submedian papillæ a little further back; body filiform and sharply attenuated at the extremities; cuticle thick and smooth, ornamented with small, slightly projecting bosses arranged in two zig-zag rows along the lateral lines, which are broad and very conspicuous; vestibule with chitinous walls, very short and narrow; œsophagus narrow, of uniform diameter and not divided into two parts; intestine dilated at its origin. Male: tail bent spirally and digitiform, the cloaca being some distance from the tip of the tail; caudal alæ absent; with a variable number (five to seven pairs) of preanal papillæ and two pairs of postanal papillæ; spicules subequal;

the tail of the male is covered on both the ventral and dorsal surfaces with minute papillæ in addition to the above-mentioned rugosities. Female: tail digitiform and long; vulva near the posterior end of the œsophagus; opisthodelphys. Viviparous, larvæ unsheathed. Parasites of the abdominal cavity of rodents

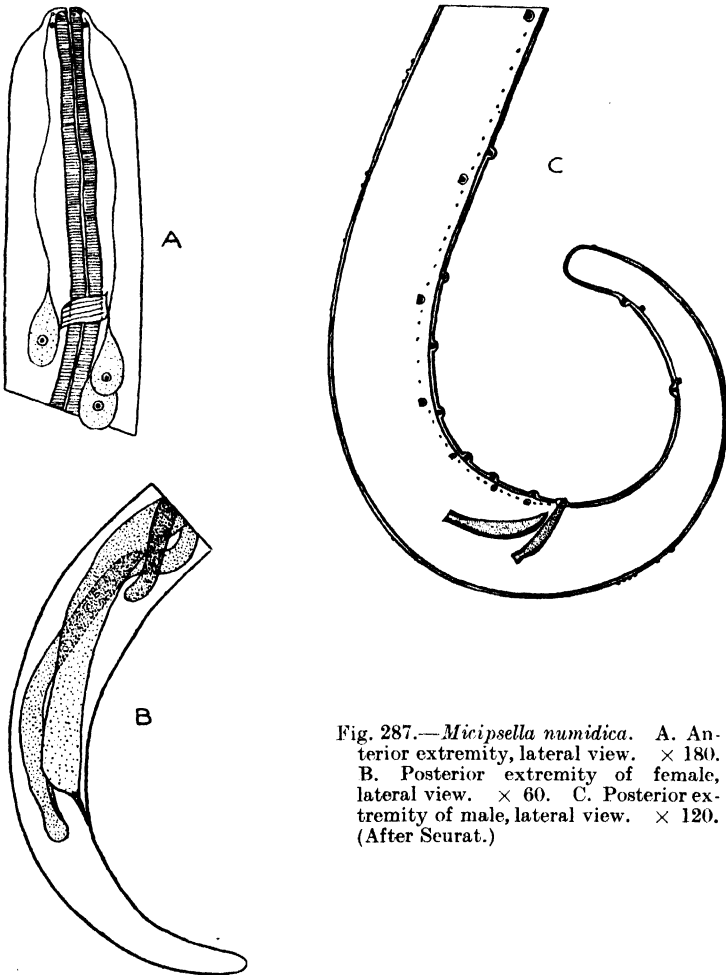


Fig. 287.—*Micipsella numidica*. A. Anterior extremity, lateral view.  $\times 180$ . B. Posterior extremity of female, lateral view.  $\times 60$ . C. Posterior extremity of male, lateral view.  $\times 120$ . (After Seurat.)

Type species: *M. numidica* (Seurat, 1917). ♂ 76 mm., ♀ 130 mm. In *Lepus pallidior* and *Lepus kabylicus*.

Syn., *Filaria numidica* Seurat, 1917.

*Cercofilaria numidica* (Seurat, 1917) Kalantarian, 1924.

Refs. 246a, 540, 562.

Genus **SPLENDIDOFILARIA** Skrjabin, 1923.

*Definition.*—**LOAINÆ**: mouth simple without lips; with four submedian and perhaps two lateral head papillæ; cervical

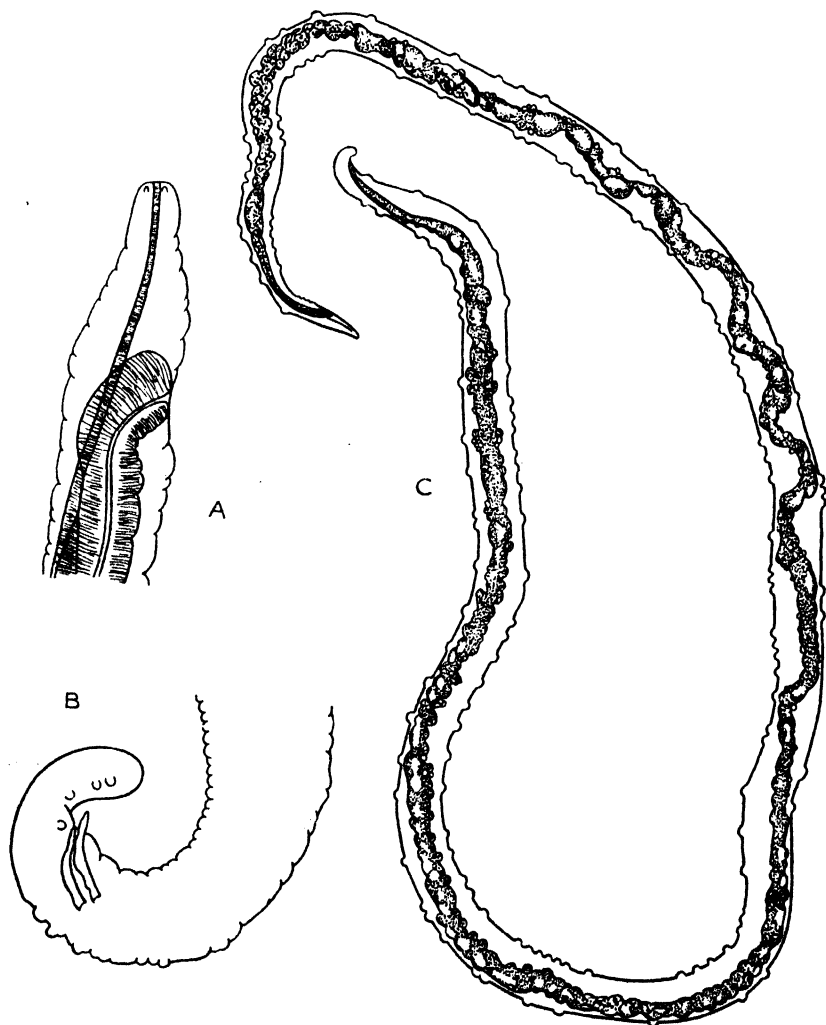


Fig. 288.—*Splendidofilaria pawlowskyi*. A. Anterior extremity of female, lateral view. B. Tail of male, lateral view. C. Female. (After Skrjabin.)

papillæ absent; cuticle without striations, but furnished with bosses; œsophagus narrow and not divided into two portions. Male: posterior extremity digitiform, caudal alæ? absent; with four pairs of postanal papillæ, preanal papillæ absent; spicules

equal, gubernaculum absent. Female: posterior extremity digitiform; vulva in the œsophageal region. Parasites of the heart-blood of birds.

Type species: *S. pawlowskyi* Skrjabin, 1923. ♂ 7·4 mm., ♀ 18·9 mm. In *Otomela phœnicuroides*.

Ref. 579a.

**Subfamily SETARIINÆ n. sf.**

*Definition.*—FILARIIDÆ: mouth surrounded by a peribuccal chitinous ring, or bounded by lateral epaulette-like structures or by small spinous teeth; spicules unequal; vulva in the œsophageal region.

KEY TO GENERA.

- |  |   |                           |
|--|---|---------------------------|
| Males with caudal alæ . . . . .  | 1 |                           |
| Males without caudal alæ . . . . .   | 3 |                           |
| 1. Lateral epaulette-like structures<br>not prolonged anteriorly to<br>form lip-like processes . . . . .   |   | Serratospiculum, p. 427.  |
| Lateral epaulette-like structures<br>prolonged anteriorly by the side<br>of the mouth to form two<br>lateral lip-like processes . . . . .                      | 2 |                           |
| 2. Large spicule stout and twisted,<br>winged and striated about mid-<br>point. Parasites of birds . . . . .   |   | Contortospiculum, p. 428. |
| Large spicule delicate and of a<br>more or less uniform diameter.<br>Parasites of reptiles . . . . .   |   | Hastospiculum, p. 431.    |
| 3. Head with lateral epaulette-like<br>structures . . . . .  |   | Dipetalonema, p. 425.     |
| Head without lateral epaulette-<br>like structures . . . . .   | 4 |                           |
| 4. Mouth without peribuccal chiti-<br>nous ring, but surrounded by<br>four small spinous teeth lying<br>internally to four prominent<br>head papillæ . . . . . |   | Icosiella, p. 424.        |
| Mouth surrounded by a peri-<br>buccal chitinous ring . . . . .   | 5 |                           |
| 5. Peribuccal chitinous ring pro-<br>longed anteriorly into four lips;<br>cuticle without bosses . . . . .   |   | Setaria, p. 422.          |



Peribuccal chitinous ring not prolonged anteriorly into four lips ;  
cuticle with bosses . . . . . Papillosetaria, p. 423.

Genus **SETARIA** Viborg, 1795.

Syn., ? *Hamularia* Treutler, 1793.

? *Tentacularia* Zeder, 1800.

? *Amularia* Brera, 1810.

? *Anchilocephali* Brera, 1810.

*Definition.*—**SETARIINÆ**: mouth surrounded by a chitinous peribuccal ring which protrudes and is prolonged anteriorly into

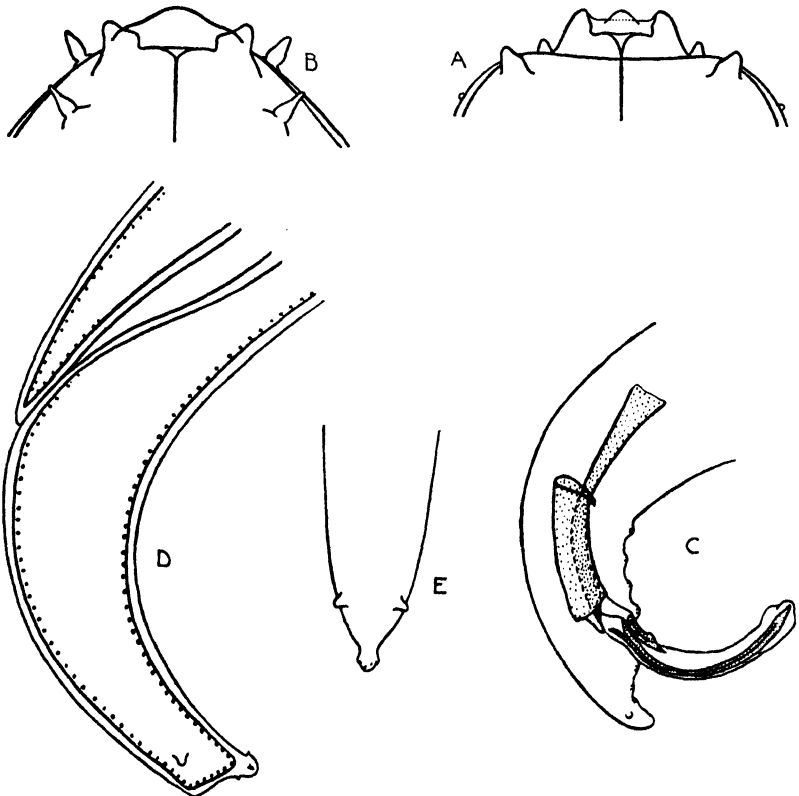


Fig. 289.—*Setaria equina*. A. Head, ventral view.  $\times 180$ . B. Head, lateral view.  $\times 180$ . C. Tail of male, lateral view.  $\times 100$ . D. Tail of female, lateral view.  $\times 100$ . E. Tail of female, dorsal view.  $\times 100$ . (Orig.)

four lips ; four prominent (sometimes spinous) submedian and two small lateral head papillæ ; cuticle transversely striated ; cervical papillæ small ; lateral flanges absent ; œsophagus divided

into two parts, a short, narrow anterior portion and a much thicker posterior portion. Male: posterior extremity attenuated and spirally rolled with a pair of small lateral cuticular appendages near the tip of the tail; caudal alæ absent; about four pairs of preanal papillæ and the same number of postanal; spicules very unequal, dissimilar, and winged. Female: posterior extremity attenuated and bent into a loose spiral, the tail ends in a rounded knob and is provided with a pair of small lateral cuticular appendages near the tip; vulva in the cesophageal region; opisthodelphys. Microfilariae sheathed and found in the blood. Parasites of the peritoneal cavity and occasionally of other regions—eye, testes, etc.—of mammals.

Type species: *S. equina* (Abildgaard, 1789). ♂ 54–80 mm., ♀ 90–130 mm. In equines.

Syn., *Gordius equinus* Abildgaard, 1789.

? *Hamularia lymphatica* Treutler, 1793.

? *Tentacularia subcompressa* Zeder, 1803.

? *Amularia linfatica* Brera, 1810.

? *Anchilocephali linfatica* Brera, 1810.

Other species:

*S. bernardi* Railliet and Henry, 1911. In pigs, Annam.

*S. bicornata* (Linstow, 1901). In *Adenota* sp.

*S. bidentata* (Molin, 1858). In *Cervidæ*, Brazil.

*S. cælum* (Linstow, 1904). In *Cephalophus sylvaticultor*.

*S. congolensis* Railliet and Henry, 1911. In *Phacochærus porcus*.

*S. cornuta* (Linstow, 1899). In antelope.

*S. digitata* (Linstow, 1906). In *Bos indicus*.

*S. effilata* (Linstow, 1897). In *Tragulus pygmæus*.

*S. hornbyi* Boulenger, 1921. In *Hippotragus niger*.

*S. javensis* Vevers, 1922. In *Tragulus stanleyanus*.

*S. labiato-papillosa* (Aless., 1838). In cattle.

*S. marshalli* Boulenger, 1921. In cattle.

*S. nudicauda*. Ortlepp, 1924. In deer.

*S. scalprum* (Linstow, 1908). In *Raphicercus campestris*.

? *S. spelæa* (Leidy, 1875). In *Macropus* sp.

*S. transversata* (Linstow, 1907). In *Cephalophus melanorheus*.

Refs. 2, 66, 381a, 428, 429, 649, 656, 658, 681, 682.

Genus **PAPILLOSETARIA** Vevers, 1922.

*Definition*.—**SETARIINÆ**: body filiform, tapering considerably in both sexes posteriorly; mouth guarded by two lateral lips which are lined by an oval ring of chitin; four head papillæ—two lateral and two submedian; cuticle covered irregularly with bosses

except in the head and tail regions ; œsophagus consists of two parts, a short anterior portion and a longer and thicker posterior portion. Male : posterior extremity coiled into a close spiral ; caudal alæ absent ; post- and pre-anal papillæ present ; spicules unequal, dissimilar, and winged. Female : tail curved dorsally

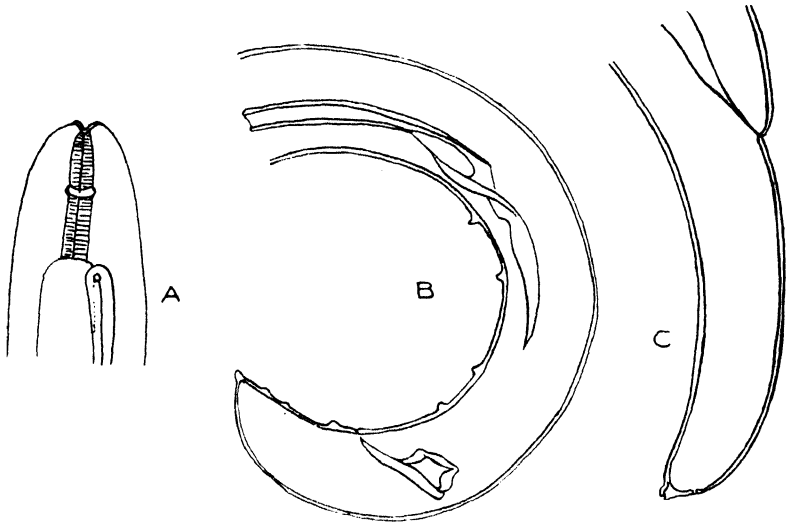


Fig. 290.—*Papillosetaria traguli*. A. Anterior extremity of female, subventral view.  $\times 45$ . B. Posterior extremity of male, lateral view.  $\times 160$ . C. Posterior extremity of female, lateral view.  $\times 130$ . (After Vevers.)

and bearing two lateral appendages close to the tip ; vulva near the anterior end of the body. Ovoviviparous. Parasites of the peritoneal cavity of antelopes.

Type species : *P. traguli* Vevers, 1922. ♂ 57 mm., ♀ 145 mm. In *Tragulus stanleyanus*.

Ref. 656.

#### Genus ICOSIELLA Seurat, 1917.

*Definition*.—**SETARINÆ** : body thin and straight ; mouth simple and surrounded by four small spinous teeth, external to these are four prominent rounded head papillæ ; cuticle thin and smooth, lateral areas broad ; lateral flanges absent ; œsophagus remarkably long and clearly divided into muscular and glandular portions. Male : tail short and rounded ; caudal alæ and genital papillæ absent ; cloaca bounded by two well-marked lips ; spicules unequal. Female : tail short and rounded ; vulva posterior to the muscular part of the œsophagus ; opisthodelphys.

Microfilariae sheathed and found in the blood. Parasites of connective, subcutaneous, and intramuscular tissue of frogs.

Type species: *I. neglecta* (Diesing, 1851). ♂ 7.2–11.4 mm., ♀ 21 mm. In *Rana* spp.

Syn., *Filaria neglecta* Dies., 1851.

Refs. 123, 406, 544.

Genus **DIPETALONEMA** Diesing, 1861.

Syn., *Acanthocheilonema* Cobbold, 1870.

*Derañophoronema* Romanovitch, 1916.

*Definition*.—**SETARIINÆ**: filiform worms tapering towards each extremity, especially posteriorly; near the tip of the tail in each sex there is laterally a pair of short conical processes giving the end of the tail a trifid appearance; in the male the lateral processes are sometimes very small and difficult to see; mouth simple without lips, but surrounded by a flat cuticular shield which extends further laterally than dorsally and ventrally, so that the anterior extremity appears wider when viewed from the dorsal or ventral aspect than from the lateral; the cuticular shield bears on each side a large lateral and a pair of smaller submedian papillae; cuticle smooth; oesophagus consists of a short anterior muscular portion and a much longer posterior glandular portion, but sometimes there is no very clear line of demarcation between the two. Male: posterior extremity spirally rolled, tail long and tapering; caudal alae absent or extremely narrow; three or four pairs of pre- or peri-anal papillae, and two pairs of postanal papillae near the tip of the tail; spicules very unequal and dissimilar, the larger is stout anteriorly and very delicate posteriorly, the smaller is fairly stout and of almost uniform diameter, both end in hooks; gubernaculum present at least in the type species. Female: posterior extremity long and tapering and extending some distance beyond the anus; vulva about the middle of the glandular portion of the oesophagus; opisthodelphys. Viviparous, embryos unsheathed and found in the peripheral blood. Parasites of serous cavities and connective tissue of mammals.

Type species: *D. gracile* (Rud., 1809). ♂ 100–150 mm., ♀ 300–350 mm. In Brazilian monkeys.

Syn., *Filaria gracilis* Rud., 1809.

*Gongylonema filiforme* Molin, 1857.

*Filaria caudispina* Molin, 1858.

*Dipetalonema caudispina* (Molin, 1858) Dies., 1861.

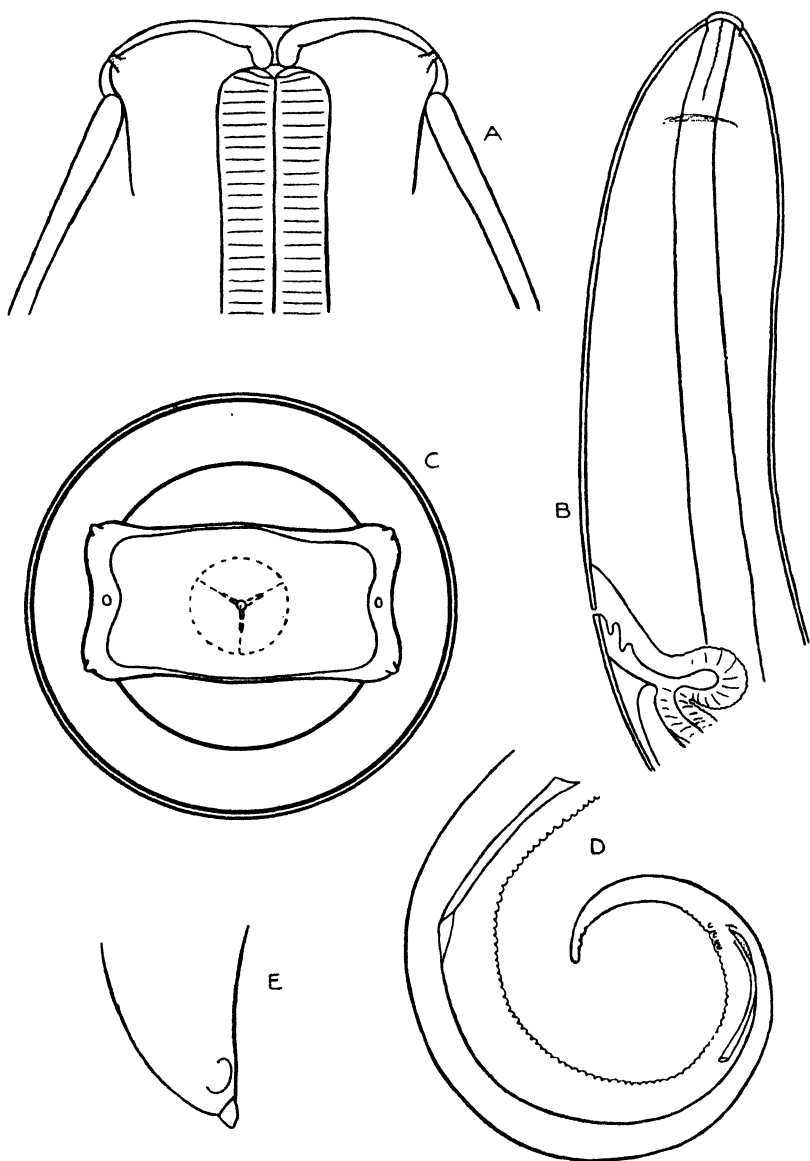


Fig. 291.—*Dipetalonema gracile*. A. Head, ventral view.  $\times 400$ . B. Anterior extremity of female, lateral view.  $\times 75$ . C. Head, end-on view.  $\times 400$ . D. Posterior extremity of male, lateral view.  $\times 80$ . E. Posterior extremity of female, lateral view.  $\times 400$ . (Orig.)

Other species :

*D. australe* (Linstow, 1897). In *Petrogale penicillata*, *Trichosurus vulpecula*.

*D. diacanthum* (Molin, 1858). In *Hystrix prehensilis*, *Erethizon dorsatum*, etc.

*D. dracunculoides* (Cobbold, 1870). In hyæna and dogs.  
Syn., *Acanthocheilonema dracunculoides* Cobbold, 1870.

*D. evansi* (Lewis, 1882). In camels.

Syn., *Filaria evansi* Lewis, 1882.

*Deraïophoronema cameli* Romanovitch, 1916.

*D. grassii* (G. Noë, 1907). In dogs.

*D. perstans* (Manson, 1891). In man.

*D. reconditum* (Grassi, 1890). In dogs.

*D. ræmeri* (Linstow, 1905). In *Macropus giganteus*.

*D. weissii* (Seurat, 1914). In *Elephantulus deserti*.

Refs. 41a, 45, 65, 73, 100, 125, 131, 291, 318, 354, 451, 472, 476, 480, 513, 604.

Genus **SERRATOSPICULUM** Skrjabin, 1916.

*Definition*.—**SETARIINÆ**: mouth simple without lips; on each side a short distance from the buccal orifice are two small epaulette

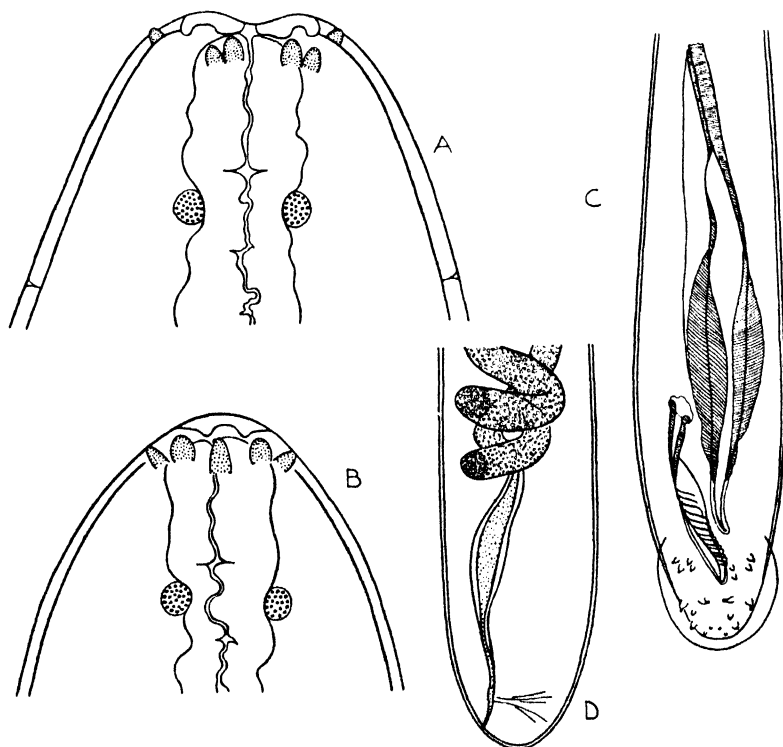


Fig. 292.—*Serratospiculum tendo*. A. Anterior extremity, ventral view.  $\times 160$ . B. Anterior extremity, lateral view.  $\times 160$ . C. Posterior extremity of male, ventral view.  $\times 71$ . D. Posterior extremity of female, lateral view.  $\times 35$ . (Orig.)

formations, each convex medianly and trilobed laterally, behind these are the lateral and submedian head papillæ; œsophagus clearly divided into two parts, the first short and narrow and the second long and broad, but gradually tapering posteriorly. Male: posterior extremity rounded with short broad caudal alæ meeting behind the tip of the tail; about four to six pairs of preanal papillæ and the same number of postanal, some of them are pedunculated; spicules unequal, of complicated structure, winged, and serrated about the middle of their length; gubernaculum absent. Female: posterior extremity rounded; anus terminal; vulva slightly behind the junction of the two portions of the œsophagus; amphidelphys. Parasites of serous cavities of carnivorous birds.

Type species: *S. turkestanicum* Skrjabin, 1916. ♂ 100 mm., ♀ 170 mm. In *Falco tinnunculus*.

Other species:

*S. guttatum* (Schneider, 1866). In *Hieracidea berigora*.

Syn., *F. attenuata* Rud., 1819, in part, not Rud., 1803, not Zeder, 1803.

*S. tendo* (Nitzsch, 1857). In *Falco peregrinus*.

Syn., *Filaria tendo* Nitzsch, 1857.

*Filaria attenuata* Rud., 1819, in part, not Rud., 1803, not Zeder, 1803.

*Filaria foveolata* Molin, 1858.

*S. verrucosum* (Molin, 1858). In *Falco swainsoni*.

Refs. 41a, 354, 446, 480, 524, 572, 574, 578.

#### Genus **CONTORTOSPICULUM** Skrjabin, 1917.

Syn., *Dicheilonema* \* Dies., 1861, in part.

? *Monopetalonema* † Dies., 1861.

*Definition*.—**SETARIINÆ**: large worms, the female being much longer and stouter than the male; mouth oval, long axis dorso-ventral, surrounded by a chitinous collar which is raised anteriorly beyond the level of the rest of the cuticle and prolonged into two erect lateral processes; on each side of the mouth is a thick cuticular epaulette-like structure which is attached to the collar internally and ends in three rounded processes externally—a lateral and two submedian: each of these three processes has a large papilla, and there are also two additional papillæ lying in the spaces between them; cuticle transversely striated; œsophagus

\* *Vide* footnote, p. 437.

† *Vide* footnote, p. 438.

clearly divided into two parts, the anterior short and the posterior broad and very long. Male : posterior extremity bent ventrally ; large caudal alæ meeting posteriorly behind the tip of the tail with a number of large pedunculated pre- and post-anal papillæ on each side ; near the tip of the tail there are a few pairs of

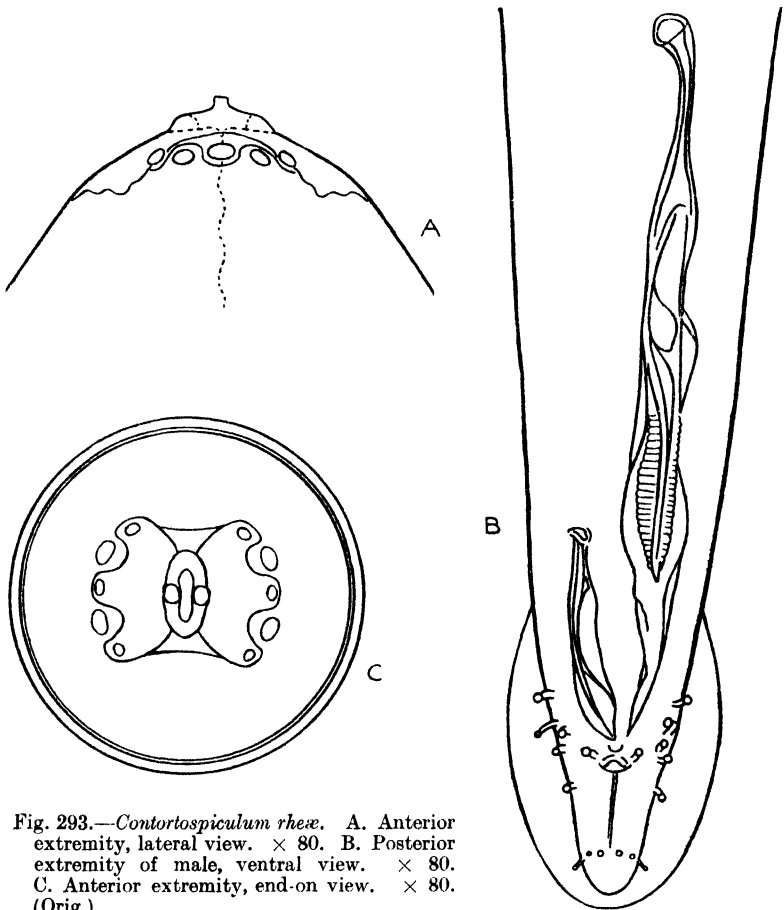


Fig. 293.—*Contortospiculum rheæ*. A. Anterior extremity, lateral view.  $\times 80$ . B. Posterior extremity of male, ventral view.  $\times 80$ . C. Anterior extremity, end-on view.  $\times 80$ . (Orig.)

smaller papillæ of which one at least is pedunculated ; spicules very unequal, the larger being twisted, strongly striated in its posterior half, and provided with large wings, the smaller is also winged in its posterior half. Female : posterior extremity rounded ; anus atrophied and opening very near the tip of the tail ; vulva about the junction of the anterior and posterior portions of the œsophagus ; amphidelphys. Oviparous. Parasites of birds.



Type species : *C. rheæ* (Owen, 1843). ♂ 175–325 mm., ♀ 665–1,350 mm. In *Rhea americana*, *Struthio crux*, and *Otis tarda*.

Syn., *Filaria rheæ* Owen, 1843.

*Filaria horrida* Dies., 1851.

*Dicheilonema horridum* (Dies, 1851) Dies., 1861.

*Contortospiculum horridum* (Dies., 1851) Skrjabin, 1917.

Other species :

*C. americanum* Railliet, 1918. In *Asio accipitrinus*.

Syn., *Filaria* sp. Leidy, 1884.

*C. ciconiæ* (Schränk, 1788). In *Ciconia nigra*.

Syn., *Filaria ciconiæ* Schränk, 1788.

*Filaria labiata* Creplin, 1825.

*C. nodulosum* (Rud., 1820). In *Lanius* spp.

Syn., *Filaria nodulosa* Rud., 1820.

*Filaria obtuso-caudata* Rud., 1819.

*Monopetalonema obtuse-caudatum* Dies., 1861.

Refs. 112, 125, 131, 362, 410, 481, 524, 578.

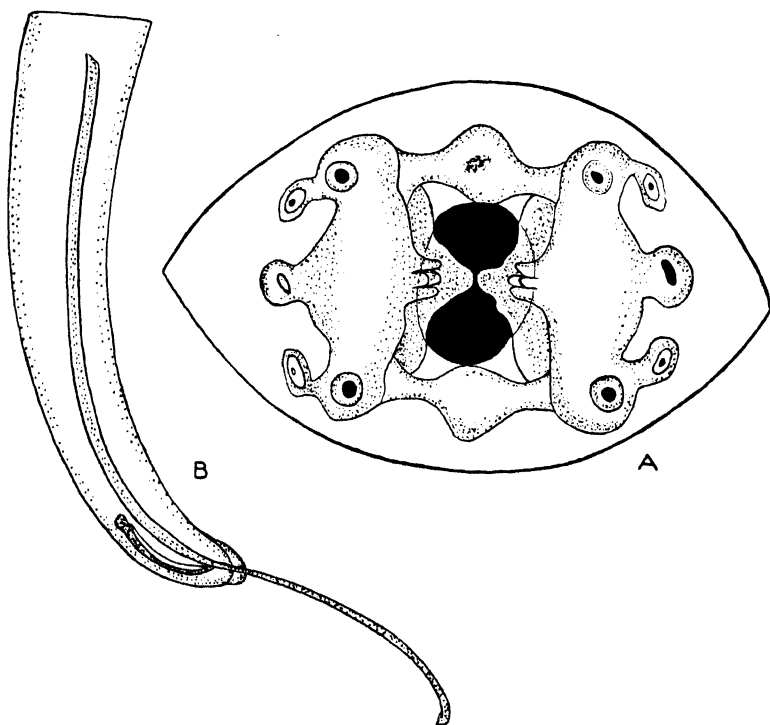


Fig. 294.—*Hastospiculum varani*. A. Anterior extremity, end-on view. Posterior extremity of male, lateral view. (After Skrjabin.)

Genus *HASTOSPICULUM* Skrjabin, 1923.

*Definition.*—*SETARIINÆ*: mouth oval, long axis dorso-ventral, bounded on each side by a projecting chitinous process or lip,

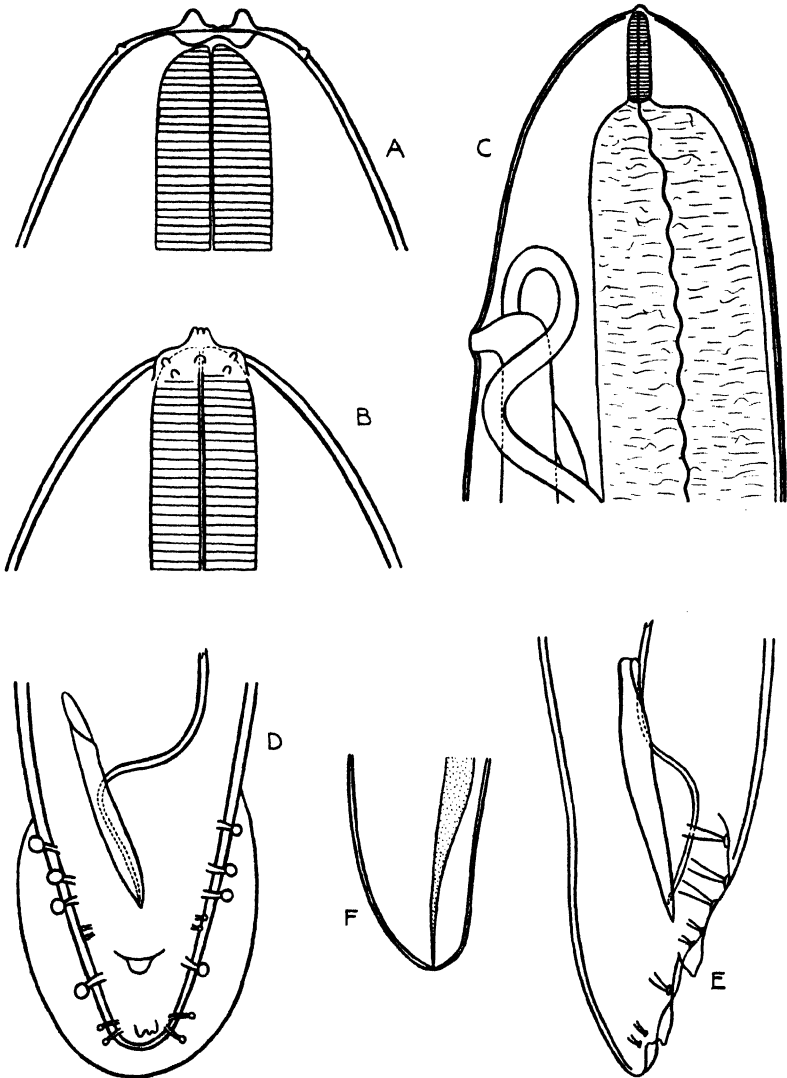


Fig. 295.—*Hastospiculum gouldi*. A. Anterior extremity of male, ventral view.  $\times 180$ . B. Anterior extremity of male, lateral view.  $\times 180$ . C. Anterior extremity of female, lateral view.  $\times 40$ . D. Posterior extremity of male, ventral view.  $\times 180$ . E. Posterior extremity of male, lateral view.  $\times 180$ . F. Posterior extremity of female, lateral view.  $\times 20$ . (Orig.)

externally to which are thick cuticular lateral epaulette-like structures ending in three processes externally and bearing a lateral and two pairs of submedian papillæ; œsophagus clearly divided into two parts, the anterior short and narrow, and the posterior broad and very long. Male: posterior extremity almost straight; large caudal alæ meeting posteriorly behind the tip of the tail with a number of large pedunculated preanal papillæ on each side; on the mid-line ventrally there are (at least in *H. gouldi*) two conical processes, the first in the neighbourhood of the cloaca and the second near the tip of the tail; spicules very unequal, the longer delicate and the shorter stout and twisted. Female: posterior extremity rounded; anus atrophied and opening very near the tip of the tail; vulva slightly behind the termination of the anterior portion of the œsophagus; amphidelphys. Oviparous. Parasites of reptiles.

Type species: *H. varani* Skrjabin, 1923. ♂ 135–140 mm., ♀ ? In *Varanus griseus*.

Other species: \**H. gouldi* n. sp. In *Varanus gouldi*.

Ref. 580.

#### Subfamily DIPLOTRIÆNINÆ Skrjabin, 1916.

*Definition*.—FILARIOIDÆ: mouth simple without peribuccal chitinous ring or epaulette-like structures; with trident-like chitinous structures on each side of the anterior end of the œsophagus; spicules unequal; vulva in œsophageal region.

Genus *DIPLOTRIÆNA* Railliet and Henry, 1909.

Syn., *Triplotriæna* Connal, 1912.

*Definition*.—DIPLOTRIÆNINÆ: body slightly attenuated at the two extremities; mouth simple without lips, surrounded by two lateral and four submedian very small head papillæ; cuticle smooth; œsophagus long, consisting of two parts, at its anterior extremity are two lateral chitinous structures, each consisting of a stalk directed forwards and a trident-like process directed backwards. Male: tail rounded, caudal alæ absent, papillæ usually absent; spicules unequal. Female: vulva shortly behind the muscular part of the œsophagus; amphidelphys.

\* *Hastospiculum gouldi* n. sp. Length of male about 45 mm., female about 180 mm. The length of the first part of the œsophagus is about 300  $\mu$  in the male and also in the female, and that of the second part of the œsophagus is 9.4 mm. in the male and 16 mm. in the female. Spicules measure about 1.1 mm. and 200  $\mu$  respectively in length. In the female the vulva is about 1 mm. from the anterior extremity.

Oviparous, eggs with thick shells and containing fully-developed embryos at deposition. Parasites of cavities of birds.

Type species : *D. ozouxi* Railliet and Henry, 1909. ♂ 3–4 mm., ♀ 6 mm. In *Faudias madagascariensis*.

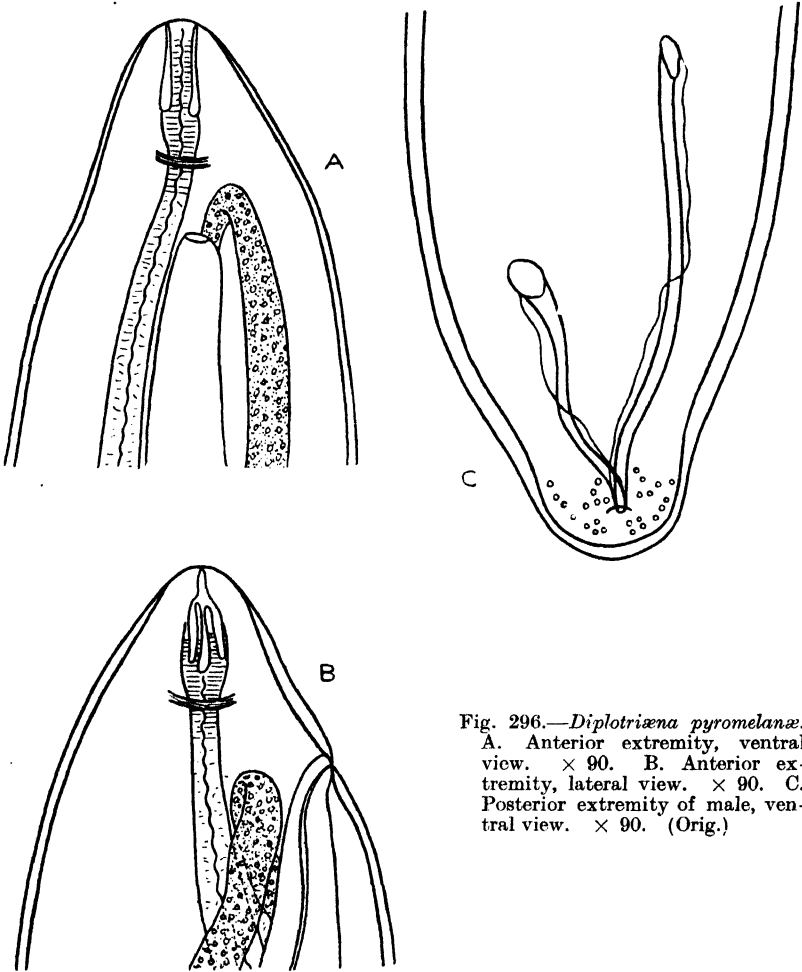


Fig. 296.—*Diplotriæna pyromelanæ*. A. Anterior extremity, ventral view.  $\times 90$ . B. Anterior extremity, lateral view.  $\times 90$ . C. Posterior extremity of male, ventral view.  $\times 90$ . (Orig.)

Other species :

? *D. abbreviata* (Rud., 1819). In *Motacilla stapazina*.

*D. affinis* (Rud., 1819). In *Fringilla* sp.

*D. artemisiana* Schmerling, 1925. In *Coracias garrula*.

*D. attenuato-verrucosa* (Molin, 1858). In *Thamnophilus canadensis*.

- D. bargusinica* Skrjabin, 1917. In *Turdus* sp.  
*D. chamoensis* (Parona).—Henry and O'Zoux, 1909.  
*D. diucæ* Boulenger, 1920. In *Diuca grisea*.  
*D. falconis* (Connal, 1912). In *Falco* sp.  
 Syn., *Triplotriæna falconis* Connal, 1912.  
*D. filiformis* (Molin, 1858) In *Anabates rufifrons*.  
*D. flabellata* (Linstow, 1888). In *Paradisea apoda*.  
*D. macrophallos* (Parona, 1889). In *Hydrosaurus salvator*.  
*D. obtusa* (Rud., 1802), not Schneider, 1866. In *Hirundo rustica*.  
*D. paronai* (Stossich, 1897). In *Buceros nasutus*.  
*D. pungens* (Schneider, 1866). In *Turdus cyaneus*.  
 \**D. pyromelanæ* n. sp. In *Pyromelana oryx*.  
*D. quadriverrucosa* (Molin, 1858). In *Dendrocalaptes picus*.  
*D. sokolowi* Skrjabin, 1916. In *Halcyon senegaloides*.  
*D. spermospizæ* (Linstow, 1879). In *Spermospiza guttata*.  
*D. tinamicola* Skrjabin, 1916. In *Tinamus* sp.  
*D. tricuspis* (Fedtsch., 1874). In *Corvus cornix*, *Alæmon duponti*, etc.  
 Syn., *Filaria tricuspis* Fedtschenko, 1874.  
*F. cornicis* Gmelin, 1790 [nom. nudum].  
*F. attenuata* Rud., 1819, in part, not Rud., 1803, not Zeder, 1803.  
 ? *F. ecaudata* Oerley, 1882.  
 ? *F. ninnii* Stossich, 1891.  
 ? *F. sturni* Rud., 1809.

Refs. 65, 111, 215, 446, 479a, 573, 574, 578.

Subfamily MICROPLEURINÆ Baylis and Daubney, 1922.

*Definition*.—FILARIIDÆ: mouth simple without a chitinous peribuccal ring or epaulette-like structures; without chitinous tridents on each side of the anterior end of the œsophagus; cuticle smooth or transversely striated; spicules equal; vulva near the middle of the body.

Genus MICROPLEURA Linstow, 1906.

*Definition*.—MICROPLEURINÆ: mouth simple without lips; with two lateral and four submedian head papillæ; cuticle with fine transverse striations and with a few minute papillæ on the

\* *Diplotriæna pyromelanæ* n. sp. Length of male 14 mm., female 35–45 mm. Length of œsophagus in the male is about 2·8 mm. and in the female 3–4 mm. Tridents reach back from the anterior extremity in the male about 150  $\mu$  and in the female about 160–170  $\mu$ . Spicules measure 690  $\mu$  and 415  $\mu$  respectively in length; and the ventral surface of the posterior extremity of the male is furnished with about twelve pairs of sessile papillæ on each side. In the female the vulva is about 1·2 mm. from the anterior extremity, and the anus is near the tip of the tail.

posterior part of the worm ; œsophagus divided into an anterior narrow muscular portion, and a much longer and wider posterior glandular portion. Male : posterior extremity conical and tapering, with a caudal ala on the right side ; three pairs of preanal

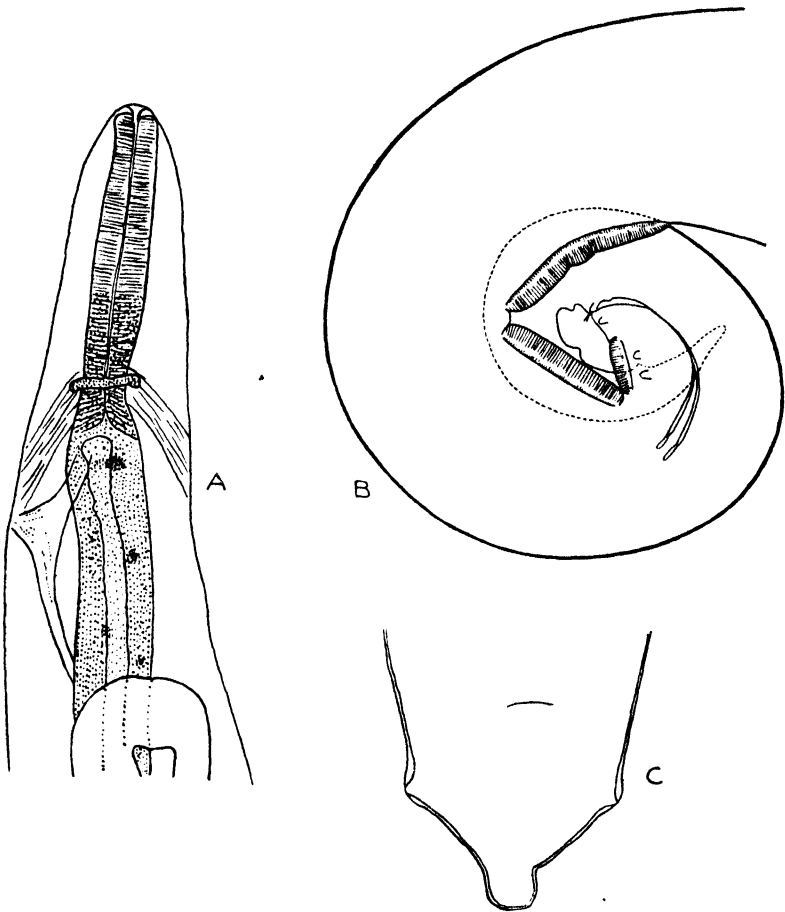


Fig. 297.—*Micropleura vivipara*. A. Anterior extremity, lateral view.  $\times 48$ . (After Baylis and Daubney.) B. Posterior extremity of male, lateral view. (After Baylis.) C. Posterior extremity of female, ventral view.  $\times 160$ . (After Baylis and Daubney.)

and four of postanal papillæ ; spicules equal, very slender and tapering to fine points. Female : posterior extremity resembles that of the male, there being a short bluntly rounded tail with a large rounded papillæ on each side of the anus ; vulva slightly in front of the middle of the body ; uteri opposed. Viviparous. Parasites of crocodiles.

Type species: \**M. vivipara* Linstow, 1906. ♂ 10 mm.  
 ♀ 43 mm. In *Gavialis gangeticus*.  
 Refs. 40, 42, 327.

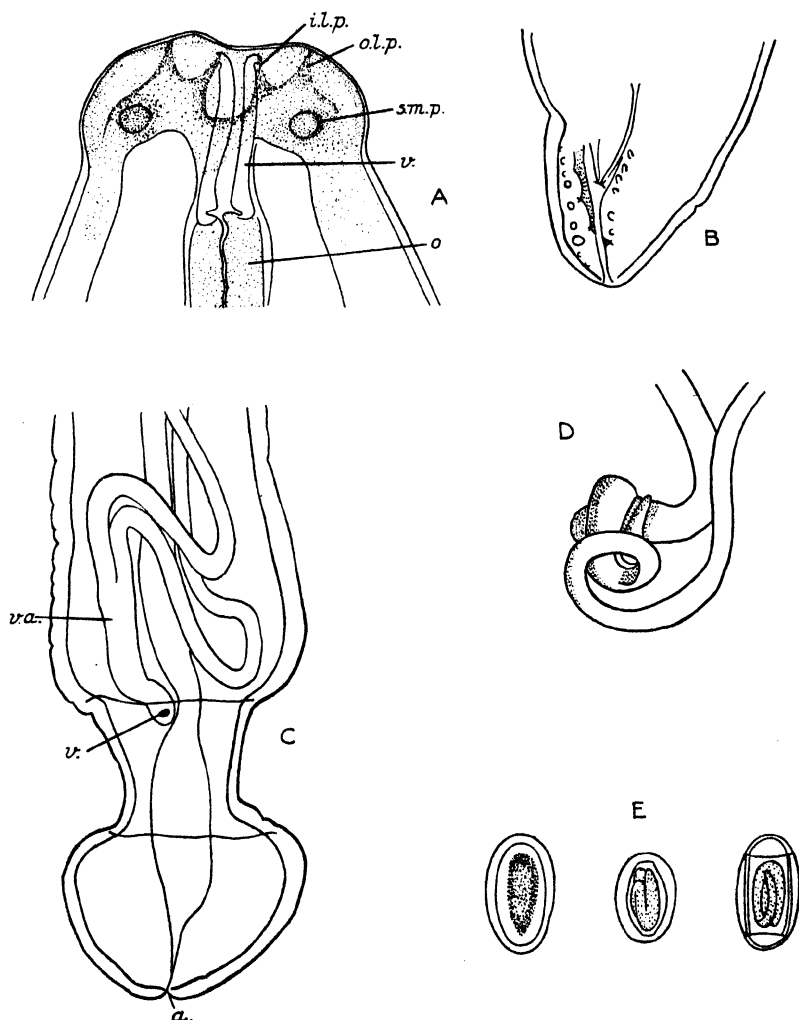


Fig. 298.—*Crassicauda crassicauda*. A. Anterior extremity, ventral view. *i.l.p.*, inner lateral papilla; *o.l.p.*, outer lateral papilla; *s.m.p.*, submedian papilla; *v.*, vestibule; *o.*, oesophagus.  $\times 130$ . B. Posterior extremity of male, subventral view.  $\times 30$ . C. Posterior extremity of female, subventral view. *va.*, vagina; *v.*, vulva; *a.*, anus.  $\times 26$ . D. Posterior extremities, in copulation.  $\times 5$ . E. Eggs.  $\times 160$ . (After Baylis.)

\* Baylis (1924) suggests that von Linstow's male represents a different worm altogether from *M. vivipara*.

## Subfamily CRASSICAUDINÆ n.sf.

*Definition.*—FILARIIDÆ: mouth simple without lips; cuticle transversely striated; posterior extremity bluntly rounded; anus terminal in both sexes; vulva near the posterior end of the body in a constriction just in front of the knob-like caudal extremity.

Genus CRASSICAUDA Leiper and Atkinson, 1914.

*Definition.*—CRASSICAUDINÆ: mouth without lips, but with one small papilla on each side of the head and more externally provided with three larger papillæ on each side; vestibule cylindrical with thick walls and compressed laterally; cuticle thick, transversely striated, sometimes raised into a swelling which appears to serve as a fixation organ; œsophagus divided into a short anterior, and a long posterior, part. Male: posterior extremity laterally compressed and spirally coiled; with a ventral groove behind the cloaca; at either side of the groove is a somewhat irregular row of genital papillæ; spicules small and unequal, or absent. Female: vulva near the posterior end of the body in a constriction just in front of the knob-like caudal extremity; vagina very short, uteri parallel; anus terminal. Oviparous, eggs with a thick shell containing an embryo when deposited. Parasites of the urogenital system (or, exceptionally, of other parts of the body) of Cetacea.

Type species: *C. crassicauda* (Creplin, 1829), not Leiper and Atkinson, 1914. ♂ 150–160 mm., ♀ 300–325 mm. In *Balænoptera* spp., etc.

Syn., *Filaria crassicauda* Creplin, 1829.

Other species: *C. boopis* Baylis, 1920. In *Megaptera nodosa*.

Syn., *C. crassicauda* (Creplin, 1829) of Leiper and Atkinson, 1914.

Refs. 18, 25, 32, 113, 295, 296.

## FILARIIDÆ insufficiently known.

Genus DICHEILONEMA \* Diesing, 1861.

*Definition.*—FILARIIDÆ: body attenuated at the extremities; mouth unarmed, elliptical, with two very small rounded unarmed lips; tip of the tail bifid. Male: caudal extremity spirally coiled; spicules unequal, the larger being tubular and short. Female:

\* There is some doubt regarding the type of this genus in which ten species were placed by Diesing. According to Stiles and Hassall (1905), the type should probably be *Filaria labiata* Creplin, 1825, in which case the genus *Dicheilonema* would replace *Contortospiculum* Skrjabin, 1917. Railliet, however, considers that, as Diesing based the genus exclusively on the tubular form of the large spicule, and as this character was known only in *Filaria bifida* Molin, 1858, this species must be considered the type of the genus.



posterior extremity incurved ventrally; vulva in the anterior part of the body.

Type species: *D. bifidum* (Molin, 1858). ♂ 52 mm., ♀ only fragments found. In *Dactylomys amblyonyx*.

Syn., *Filaria bifida* Molin, 1858.

Refs. 125, 354, 410.

**Genus MONOPETALONEMA\* Diesing, 1861.**

*Definition*.—FILARIOIDÆ: body very long and filiform; mouth with two lips. Male: posterior extremity bent ventrally; caudal alæ and papillæ present; spicule single! Female: blunt straight tail; vulva in anterior part of body? Parasites in connective tissue and abdominal cavity of Brazilian birds and badgers.

Type species: ? *M. physalurum* (Bremser, 1851) Dies, 1861. ♂ 37–75 mm., ♀ 150–250 mm. In *Alcedo amazona*.

Other species: *M. eremita* Leidy, 1886. In *Meles labradorica*.

Refs. 123, 125, 272, 354, 454, 480, 524.

**Genus ELAPHOCEPHALUS Molin, 1860.**

*Definition*.—FILARIOIDÆ: mouth with two small conical lips, from each lip two band-like processes are directed posteriorly,

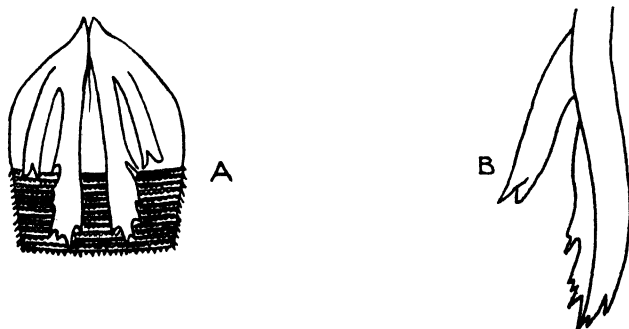


Fig. 299.—*Elaphocephalus octocornutus*. A. Anterior extremity, ventral view.  $\times 140$ . B. Cephalic process.  $\times 280$ . (After Drasche.)

each of these processes subdivides into two branches of unequal length, serrated at their terminations; cuticle furnished with closely set rings of small posteriorly-directed spines. Male: unknown. Female: vulva near mouth. Parasites in the feet of birds.

\* The type species of this genus is uncertain. Diesing placed in it two species, viz. *M. physalurum* (Bremser, 1851) and *M. obtuse-caudatum* Diesing, 1861; the latter is synonymous with *Filaria nodulosa* Rud., 1820, and belongs to the genus *Contortospiculum*. Very little appears to be known regarding *M. physalurum* (Bremser, 1851), but it seems quite possible that it really belongs to the same genus as *M. obtuse-caudatum*, in which case the genus *Contortospiculum* would fall as a synonym of *Monopetalonema*.

Type species : *E. octocornutus* Molin, 1860. ♂ ?, ♀ 12 mm. In *Psittacus macao*.

Refs. 128, 359.

Genus **SOLENONEMA** Diesing, 1861.

*Definition*.—**FILARIIDÆ** : body very long and filiform ; head continuous with body ; mouth terminal. Male : caudal extremity twisted spirally, papillate ; spicules tubular or subglobular. Female : vulva in anterior part of body. Parasites in subcutaneous and intramuscular connective tissue of American tropical mammals.

Type species ?

Containing the species.

*S. æquale* (Molin, 1858). ♂ 37 mm., ♀ 60–65 mm. In *Myrmecophaga jubata*.

*S. serpiculum* (Molin, 1858). ♂ 50 mm., ♀ 50–100 mm. In *Phyllostoma brevicaudum*.

*S. striatum* (Molin, 1858). ♂ 110 mm., ♀ 375 mm. In *Felis* spp.

Refs. 125, 354.

Genus **TETRACHEILONEMA** Diesing, 1861.

*Definition*.—**FILARIIDÆ** : body very long and filiform ; four large conical lips. Male : caudal extremity twisted and blunt. Female : vulva in anterior part of body. Viviparous. Parasites of abdominal cavity and subcutaneous tissue of Brazilian birds.

Type species : *T. quadrilabiatum* (Molin, 1858). ♂ 30 mm., ♀ 37–50 mm. In *Tinamus rufescens* and *T. maculosus*.

Syn., *Filaria quadrilabiata* Molin, 1858.

*Filaria tinami* Molin, 1858.

*Filaria labiotruncata* Molin, 1858.

Refs. 125, 354, 454.

Genus **FILAROIDES** Beneden, 1858.

*Definition*.—**FILARIIDÆ** ? : very long filiform worms ; the cuticle is characterised by transverse overriding folds which allow the worm to extend according to the development of its genitalia ; mouth terminal. Male : spicules very short and delicate. Female : vulva near the mouth in the œsophageal region ; two ovaries. Viviparous.

Type species : *F. mustelorum* (Rud., 1819) Beneden, 1858. ♂ ?, ♀ 150–170 mm. Encysted in the lungs of martens, weasels, etc.

Syn., *Filaria mustelorum pulmonalis* Rud., 1819.

Refs. 48, 125, 131.

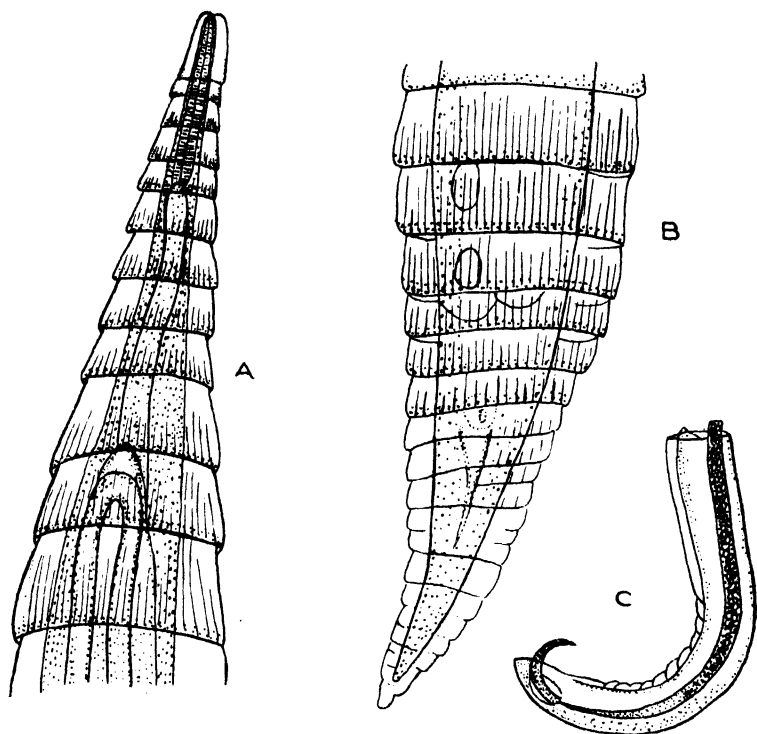


Fig. 300.—*Filaroides mustelarum*. A. Anterior extremity of female, ventral view. B. Posterior extremity of female. C. Posterior extremity of male, lateral view. (After van Beneden.)

#### FAMILY DRACUNCULIDÆ LEIPER, 1912.

*Definition*.—FILARIOIDEA: females enormously larger than the males; anus and vulva atrophied in the gravid female.

#### Subfamily DRACUNCULINÆ (Stiles, 1907).

Syn., *Dracunculiniæ* Stiles, 1907.

*Definition*.—DRACUNCULIDÆ: with the characters of the family.

#### KEY TO GENERA.

- With a cephalic shield; vulva near head;  
parasites of mammals . . . . . *Dracunculus*, p. 442.
- Without a cephalic shield; vulva at junction  
of middle and posterior thirds of  
body; parasites of fishes . . . . . *Philometra*, p. 442.

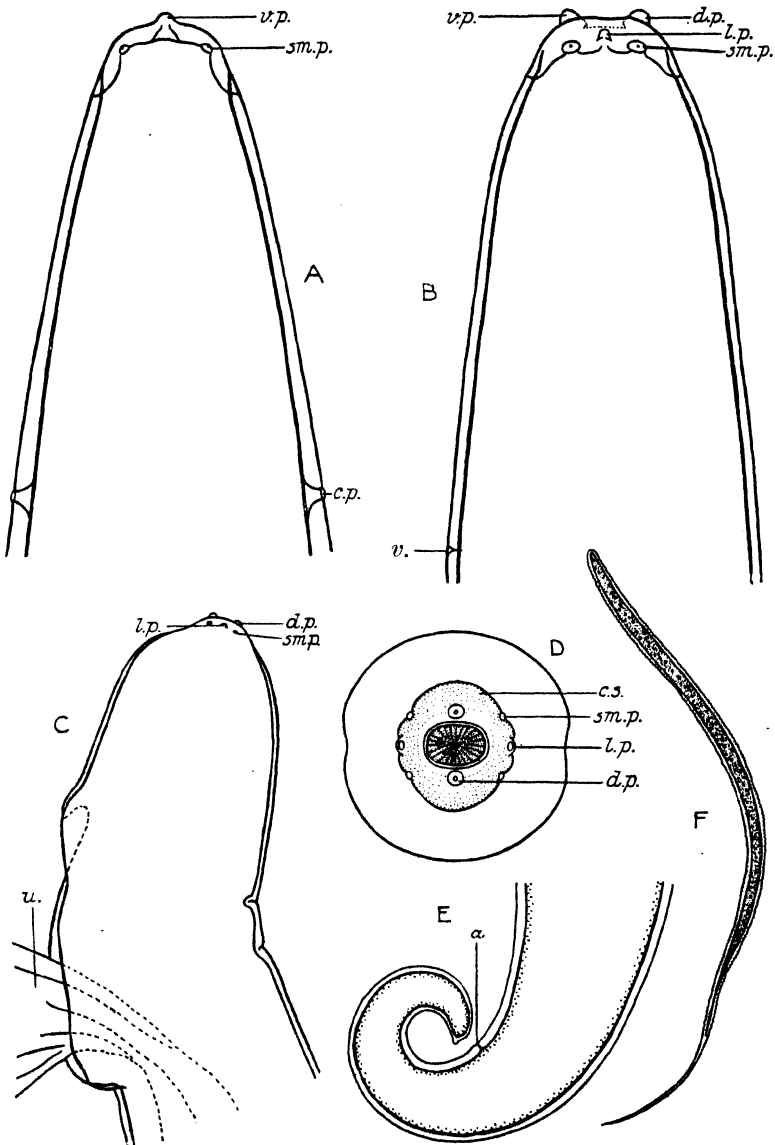


Fig. 301.—*Dracunculus medinensis*. A. Anterior extremity of female, ventral view. *v.p.*, ventral papilla; *sm.p.*, submedian papilla; *c.p.*, cervical papilla.  $\times 64$ . B. Anterior extremity of young female, lateral view. *v.p.*, ventral papilla; *d.p.*, dorsal papilla; *l.p.*, lateral papilla; *sm.p.*, submedian papilla; *v.*, vulva.  $\times 64$ . C. Anterior extremity of gravid female, lateral view. *u.*, uterus prolapsed through vulva.  $\times 32$ . D. Head, end-on view. *c.s.*, cephalic shield; *sm.p.*, submedian papilla; *l.p.*, lateral papilla; *d.p.*, dorsal papilla.  $\times 64$ . E. Posterior extremity of female, lateral view. *a.*, anus.  $\times 64$ . F. Larva.  $\times 160$ . (Orig.)

Genus **DRACUNCULUS** Reichard, 1759.Syn., *Vena* Gallandat, 1773.*Vermiculus* Duglison, 1895.

*Definition.*—**DRACUNCULIDÆ**: anterior extremity dome-shaped and provided with a cuticular thickening or shield; mouth oval and bears on its dorsal and ventral borders a large rounded papilla; further back on the cuticular shield are two lateral and four submedian papillæ; cervical papillæ small, about 1 mm. from the anterior extremity; œsophagus long and cylindrical; anus and the lower part of the intestine atrophied. Male: practically unknown. Female: vulva and vagina atrophied; situation of vulva immediately behind the head; the main bulk of the worm is occupied by a greatly distended uterus filled with embryos; when ready to discharge its contents, the uterus bursts through the body wall immediately behind the anterior extremity in the neighbourhood of the atrophied vulva; tail coiled ventrally to a varying extent, tapers rather suddenly near its end, and terminates in a small conical process. Viviparous, the embryos being provided with long pointed tails. Parasites of body tissues of vertebrates.

Type species: *D. medinensis* (Linnæus, 1758). ♂ 22 mm., ♀ 400–900 mm. In man, dog, horse, cattle, jackal, leopard, baboon, cobra, etc.

Syn., *Filaria medinensis* Linnæus, 1758.

*Vena medinensis* (Linn., 1758). Gallandat, 1773.

*Vermiculus capillaris* Duglison, 1895.

? *D. dahomensis* Neum., 1895. In *Python natalensis*.

Refs. 17, 237, 282, 290, 397, 650.

Genus **PHILOMETRA** Costa, 1845.

Syn., *Ichthyonema* Diesing, 1861.

*Definition.*—**DRACUNCULIDÆ**: female enormously larger than male; body filiform; anterior and posterior extremities rounded; mouth with or without lips and head papillæ; œsophagus cylindrical, very short. Male: posterior extremity rounded, cloaca terminal, bordered by two lips; spicules equal and needle-like; gubernaculum present. Female: anus and vulva atrophied; the situation of the vulva in young worms is at the junction of the middle and posterior thirds of the body; body occupied almost entirely by the uterus filled with embryos; there is a small ovary

at each end of the body. Parasitic in the body cavities and tissues of fishes (and sea-urchins).

Type species: *P. globiceps* (Rudolphi, 1819). ♂ up to 6–8 mm., ♀ up to 200 mm. or more. In *Blennius phycis*, *Uranoscopus scaber*.

Syn., *Filaria globiceps* Rud., 1819.

*Philometra recticaudata* Costa, 1845.

Other species:

*P. acipenseris* (del Lupo, 1898). In *Acipenser sturio*.

*P. congeri-vulgaris* (Molin, 1859). In *Conger vulgaris*.

*P. cylindracea* (Ward and Magath, 1916). In *Perca flavescens*.

*P. filiformis* (Stoss., 1896). In *Pagellus* sp., *Trachinus* sp.

*P. fusca* (Rud., 1819). In *Labrax lupus*.

*P. grayi* (Gemmill and Linstow, 1902). In *Echinus escul.*

*P. ovata* (Zed., 1803). In *Squalius dobula*.

*P. pellucida* (Jaegers., 1893). In *Tetrodon stellatus*.

*P. rischta* Skrjabin, 1923. In *Pseudaspis leptocephalus*.

*P. sanguinea* (Rud., 1819). In *Abramis vimba*.

Refs. 125, 322, 334, 405, 477, 480, 581, 606, 662.

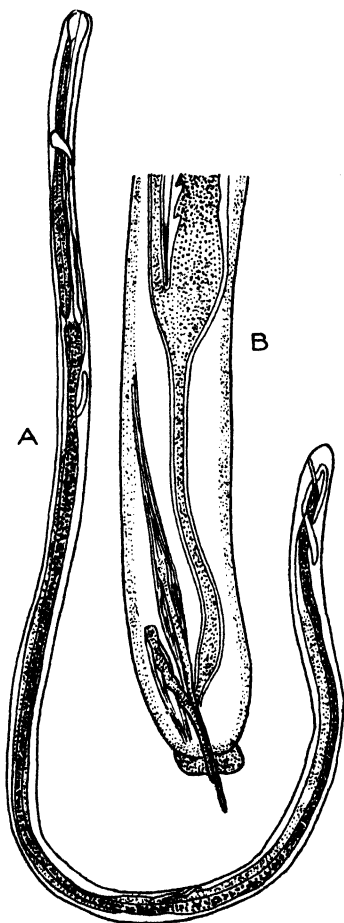


Fig. 302.—*Philometra globiceps*. A. Young female. B. Posterior extremity of male. (After Strassen.)

## GENERA INSUFFICIENTLY KNOWN AND OF UNCERTAIN SYSTEMATIC POSITION.

Genus *GALEICEPS* Railliet, 1916.

**Definition.**—EUNEMATODA: anterior extremity with a hood-like covering, the circumoral portion of which projects forwards

round the mouth as four lip-like projections, the two subdorsal being near together, and the two subventral separated from one

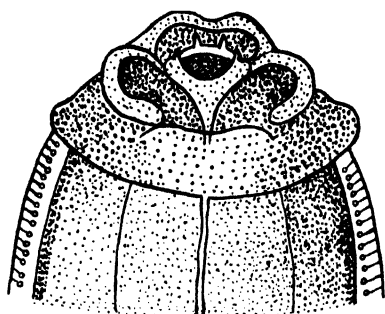


Fig. 303.—*Galeiceps cucullus*. Anterior extremity, ventral view. (After Linstow.)

another by a space; the oral border of each of these swellings is provided with a tooth; cuticle with transverse striations, and also with thick wavy longitudinal lines; œsophagus long. Male: posterior extremity rounded; two longitudinal rows of numerous preanal papillæ, and a pair of doubled postanal papillæ; spicules long and equal. Female: posterior extremity short and pointed. Parasites of insectivorous mammals.

Type species: *G. cucullus* (Linstow, 1899). ♂ 16 mm., ♀ 24 mm. In *Potamogale velox*.

Syn., *Ancyracanthus cucullus* Linstow, 1899.

Refs. 318, 404.

#### Genus *PTERYGIFER* Linstow, 1907.

*Definition*.—*EUNEMATODA*: cuticle transversely striated; head rounded, bearing four movable crescentic wing-like plates ending posteriorly in an inwardly-directed hook; the plates are attached anteriorly; cervical papillæ present. Male: unknown. Female: posterior extremity rounded; vulva just behind the middle of the body. Oviparous. Parasites of eels.

Type species: *P. tetrapteryx* Linstow, 1907. ♂ ?, ♀ 17 mm. In *Synbranchus marmoratus*.

Ref. 329.

#### Genus *CYSTOPSIS* Wagner, 1867.

Syn., *Cystoopsis* Zykov, 1902.

*Definition*.—*EUNEMATODA*: mouth funnel-shaped and surrounded by a small ring, cuticle finely striated; œsophagus long, cylindrical reaching to near the middle of the worm, followed by a dilated gut-sac which ends blindly at about 70 per cent. of the length of the

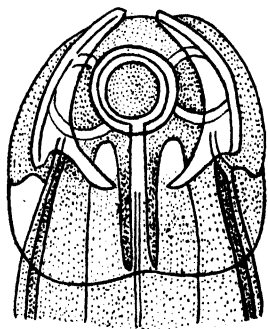


Fig. 304.—*Pterygifer tetrapteryx*. Anterior extremity. (After Linstow.)

worm from the anterior end ; anus absent. Male : sausage-shaped and extremely small ; spicules absent. Female : anterior portion cylindrical and thinner than the male ; posterior half globular ; vulva a little distance from the mouth ; the swollen posterior part of the body is occupied by the gut-sac, uterus, and ovary. Oviparous, eggs with a thick shell with a plug at each end and containing an embryo when born. Parasites of the subcutaneous tissue of fishes.

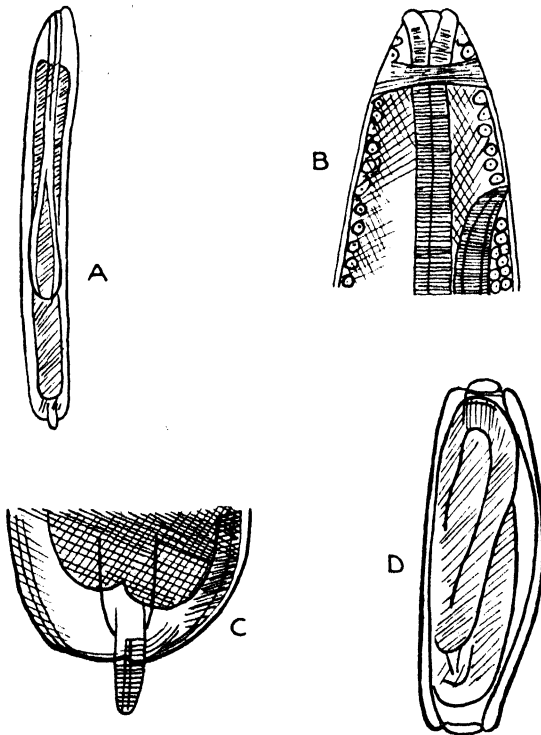


Fig. 305.—*Cystopsis acipenseris*. A. Male. B. Anterior extremity of female, lateral view. C. Posterior extremity of male. D. Egg. (After Linstow.)

Type species : *C. acipenseris* Wagner, 1867. ♂ 2.1 mm., ♀ 3.4 mm. In *Acipenser ruthenus*.

Refs. 326, 684.

Genus **MUSPICEA** Sambon, 1925.

*Definition*.—The female only is known. Body short and stout, somewhat attenuated posteriorly and terminating in a bilobed tail, the lobes being strikingly mammiloid ; cuticle with marked transverse striations ; mouth simple ; œsophagus appa-



rently terminating in a slight sub-spherical bulb ; anus situated between the tail lobes ; the uterus is apparently a continuous tube in all probability consisting of two opposed branches which appear to end in the ovaries ; vagina probably opens near the middle of the body. Viviparous. Parasites of the subcutaneous connective tissue and in the glands of rodents.

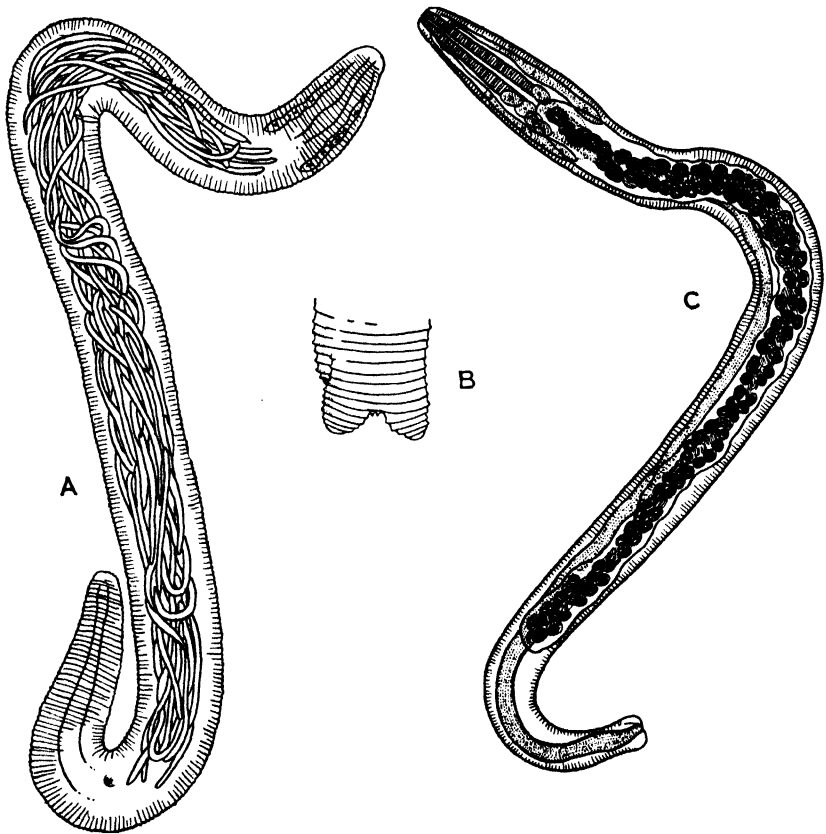


Fig. 306.—*Muspicea borreli*. A. Mature female. B. Tail of female. C. Young female. (After Sambon.)

Type species : *M. borreli* Sambon, 1925. ♀ 2·9–3·4 mm. In *Mus musculus*.

Ref. 478a.

Genus **TRICHEILONEMA** Diesing, 1861.

Syn., *Schizoeilonema* Dies., 1861, renamed.

**Definition.**—ASCAROIDEA ? : insufficiently described ; body very long and filiform, with three large thick incised lips. Male :

posterior extremity bent and blunt. Female : posterior extremity straight ; vulva in the anterior part of the body. Real habitat unknown.

Type species : *T. megalochilum* (Dies., 1851). ♂ 25–37 mm., ♀ 50–60 mm. In *Zacholus austriacus*. Probably not true host.

Syn., *Schizocheilonema megalochilum* (Dies., 1851) Dies., 1861, renamed.

*Filaria megalochila* Dies., 1851.

Refs. 123, 125.

**Genus EUSTOMA Beneden, 1870.**

The type species is *E. truncata* Beneden, 1870. In *Raja clavata*. No description is given, but two drawings of the anterior extremity from which it is impossible to place the worm.

Ref. 50.

**Genus PROTOSTRONGYLUS Leiper, 1908.**

A genus belonging to the Subfamily *Metastrongylinae*. No species is mentioned and no description given.

Ref. 275.

**Genus DISCOPHORUS Mehlis in Creplin, 1844, not  
DISCOPHORA Boisduval, 1836.**

The only species mentioned is *Discophorus tenax* Meh'is in Creplin, 1844. In *Raja clavata*. This is apparently a nomen nudum except for the host.

Ref. 115.

**Genus DITRACHYCEROS Hermann in Sultzzer, 1801.**

Syn., *Ditrachycerosoma* Brera, 1809.

*Diceras* Rud., 1810, not Lam., 1805.

The only species mentioned is *D. rude* Rud., 1810. In man. This is apparently not a parasite.

Ref. 477.

**Genus TIPASELLA ? Seurat, 1921.**

The only reference to this genus which we have been able to find is that of Seurat, 1921, who refers to it as belonging to the *Filariidae*. The only details given are that the oesophagus is divided, that the female is amphidelphys, and that the male is without caudal alæ. No species is mentioned.

Ref. 562.

Genus *FIGURIS* Schlotthauber, 1860.

The only species mentioned is *Piguris reticulata* Schlotthauber, 1860. In *Equus caballus*. Practically no description is given of the single female specimen found.

Refs. 398, 479.

Genus *PHLYCTAINOPHORA* Steiner, 1921.

*Definition*.—This generic name was given to a remarkable ? nematode *Phlyctainophora lamnæ*, found between the hyoman-

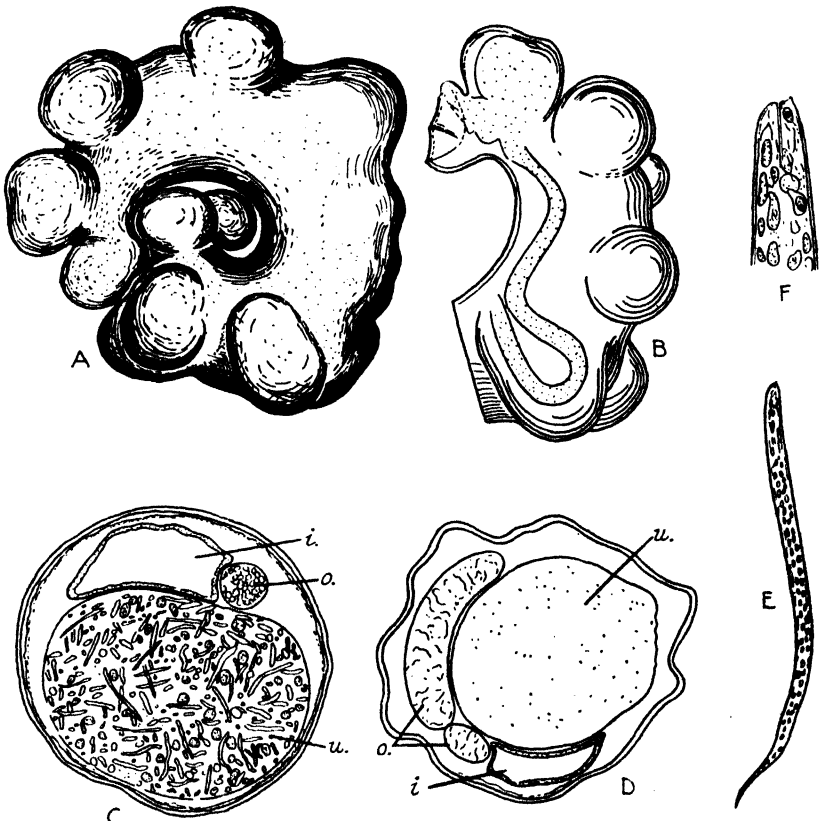


Fig. 307.—*Phlyctainophora lamnæ*. A. Whole worm seen from left side. B. Anterior end seen from left side. C and D. Transverse sections. *i*, intestine; *u*, uterus filled with larvæ; *o*, ovary. E. Larva. F. Larva, anterior extremity. (After Steiner.)

dibula arch and skull of a shark (*Lamna cornubica*). Only a single female was found; it had the appearance of a rolled-up stout cylinder provided on each subdorsal plane with an almost sym-

metrical series of fifteen large spherical projections recognizable to the naked eye. In addition, at what was apparently the anterior end, was an unpaired spherical swelling, and at the posterior end a pair of spherical swellings. The cuticle covering both the body and swellings was smooth. On the unpaired anterior swelling was what the author took to be a mouth-opening, and at the other end was an anus. Little could be made of the internal structure; sections showed the body to be full of sexual tubes loaded with embryos, and a delicate alimentary tube. The length of the adult female was 17 mm. and that of the embryos 330–350  $\mu$ .

Ref. 587a.

### Collective Group Names for Immature Nematodes.

*Agamonema* Diesing, 1851.

A collective group for immature nematodes in fishes.

*Agamofilaria* Stiles, 1907.

A collective group for immature *Filarioidea*.

*Microfilaria* Cobbold, 1880.

A. collective group for young larval *Filarioidea*, especially when found in the blood.

*Agamospirura* Henry and Sisoff, 1913.

A collective group for immature *Spiruroidea*.

*Agamascaris* Steiner, 1924.

A collective group for immature *Ascaroidea*.

## EXPLANATORY NOTES

IN order to avoid misconception, the sense in which a number of the terms found in the preceding pages are used is here defined.

*Chitin*.—This term is used in a rather broad sense as representing a substance harder than cuticle, and without intimating that it is chemically identical with the chitin of arthropods.

*Extremity*.—This word is used in a specialized sense ; “ anterior extremity ” referring to the head-end, and “ posterior extremity ” to the tail-end.

*Middle*.—This refers to the equatorial middle and not to the mid-line.

*Inner and Internal*.—These imply axial ; *e.g.* the inner surface of a lip means the buccal surface.

*Esophagus divided into Two Parts*.—This implies tandem-division into anterior and posterior portions.

To prevent confusion which might arise from the different terminology used by various authors for the rays of the strongyl bursa, we have lettered the individual rays of the bursa of *Strongylus equinus* (Fig. 10) and those of a number of others strongyls (Figs. 16, 23, 25, 31, etc.). It should be noted that ventro-ventral + latero-ventral = anterior cleft or doubled, of the French authors ; externo-lateral = antero-lateral ; medio-lateral + postero-lateral = median cleft or doubled ; external-dorsal = postero-external ; dorsal = posterior.

Whilst no type species is indicated in the lists of species in the various subgenera, the type species is always placed first in the list.

In the host names we have usually adopted the spelling of the author quoted, as we do not wish to appear to decide points of

nomenclature for hosts. In many cases, in order to save printing, we have simply given the generic name of the host and the use of "sp." or "spp." consequently does not necessarily mean that the species is undetermined. The full name of the type hosts of the various species, as stated by the original authors, is given in the alphabetical list of species at the end of the volume.

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Generic names in italics fall as synonyms, or as *nomina nuda*.

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- abbreviata* Rud., 1819, t.h. *Lacerta margaritacea*. Physaloptera, p. 352.  
*abbreviata* Rud., 1819, t.h. *Motacilla stapa* Linnaeus. [Fil.]. *Diplotriena*, p. 433.  
*abbreviatus* Rud., 1819, t.h. *Perca cirrosa*. *Cucullanus*, p. 382.  
*abjecta* Leidy, 1856, t.h. *Psammophis flagelliformis*. Physaloptera, p. 352.  
*abnormalis* May, 1920, t.h. sheep and goats. *Nematodirus*, p. 136.  
*abstrusus* Railliet, 1898, t.h. *Felis dom.* [Str.]. *Synthetocaulus*, p. 164.  
*acanthocephala* Molin, 1860, t.h. *Sterna hirundo*, *S. caspica*. [Spiropt.]. *Schistoproctus*, p. 367.  
*acanthocephalicus* Molin, 1861, t.h. *Ibis tubifex*. *Hystrichis*, p. 181.  
*acanthocirratus* Skrjabin, 1916, t.h. *Ranidæ*. *Amphibiophilus*, p. 155.  
\**acanthura* Diesing, 1851, t.h. *Lacerta muralis*. [Asc.]. *Pharyngodon*, p. 193.  
\**acanthurus* Diesing, 1861, in part. *Pharyngodon*, p. 193, and p. 194.  
*accipitri* Skrjabin, 1916, t.h. *Aquila imperialis*. *Gnathostoma*, p. 340.  
*acipenseris* del Lupo, 1898, t.h. *Acipenser sturio*. [Ichthyonema]. *Philometra*, p. 443.  
*acipenseris* Wagner, 1867, t.h. *Acipenser ruthenus*. *Cystopsis*, p. 445.  
*aculeata* Creplin, 1825, t.h. *Tringa alpina*. [Spiropt.]. *Echinuria*, p. 331.  
*aculeatum* Travassos, 1917, t.h. *Muridæ*. *Heligmosomum*, p. 142.  
*aculeatus* Linstow, 1879, t.h. *Macacus cynomolgus*. [Str.]. *Oesophagostomum*, p. 87.  
*acuminata* Molin, 1860, t.h. *Brycon falcatus*. [Spiropt.]. *Rhabdochona*, p. 325.  
*acuminata* Schrank, 1788, t.h. frogs. [Asc.]. *Aplectana*, p. 208.  
*acus* Bloch, 1779, t.h. *Esox* sp. [Asc.]. *Raphidascaris*, p. 274.  
*acus* Duj., 1845, t.h. an exotic mammal. *Stenodes*, p. 253.  
*acuticauda* Linstow, 1901, t.h. *Numida rikwæ*. [Oxysoma]. *Subulura*, p. 227.  
*acuticauda* Molin, 1860, t.h. *Falco cachinans*, etc. Physaloptera, p. 352.  
*acuticaudatum* Kotlán, 1919, t.h. Equines. [Cylicost.]. *Craterostomum*, p. 45.  
*acuticeps* Geddoelst, 1916, t.h. *Chamaeleon gracilis* and *C. dilepsis*. [Het.]. *Africana*, p. 225.  
*acutissima* Molin, 1860, t.h. *Cuculus melacoryphus*, *Strix atricapilla*. *Subulura*, p. 227.  
*acutus* Duj., 1845, t.h. *Raja clavata*. *Proleptus*, p. 358.  
\**acutus* Lundahl, 1848, t.h. *Anas crecca*, etc. [Str.]. *Amidostomum*, p. 153.  
*addictus* Railliet, Henry, and Bauche, 1914, t.h. *Elephas indicus*. [Str.]. *Decrusia*, p. 38.  
*adersi* Boulenger, 1920, t.h. donkey. [Cylicost.]. *Trichonema*, p. 55.  
*adunca* Creplin, 1846, t.h. *Colymbus septentrionalis*, etc. [Spiropt.]. *Cosmocephalus*, p. 337.  
*adunca* Rud., 1802, t.h. *Clupea alosa*. [Asc.]. *Contracæcum*, p. 282.  
*ægyptiaca* Linstow, 1902, t.h. *Ardea garzetta*. [Het.]. *Ascaridia*, p. 266.  
\**ægyptiacum* Railliet, 1923, t.h. Equines. *Trichonema*, p. 55.  
*æqualis* Molin, 1858, t.h. *Myrmecophaga jubata*. [Fil.]. *Solenonema*, p. 439.  
*ærophila* Linstow, 1906, t.h. *Phœnicopterus roseus*. [Spiropt.]. *Aprocta*, p. 405.  
*ærophila* Skrjabin, 1916, t.h. *Ardea cinerea*, *Thalacrocorax carbo*. *Desmidocerca*, p. 321.

\* Species marked thus fall as synonyms, or as *nomina nuda*.

In those cases in which a species has been removed from the genus in which it was first placed, the original genus is given in square brackets.

- aerophilum* Creplin, 1839, t.h. *Canis vulpes*. [Trichosomum]. Eucoleus, p. 29.
- affine* Leidy, 1856, t.h. *Cistudo carolina*. Spironoura, p. 239.
- \**affinis* Gedoelst, 1916, t.h. *Psammophis sibilans*. Physaloptera, p. 354.
- affinis* Graybill, 1924, t.h. rabbit. Trichostrongylus, p. 119.
- affinis* Jägerskiöld, 1904, t.h. *Vulpes niloticus*. Rictularia, p. 345.
- affinis* Mégnin, 1895, t.h. *Dolichotis patagonica*. [Str.]. Graphidioides, p. 140.
- \**affinis* Rud., 1802, t.h. *Ovis aries*. [Trichoc.]. Trichuris, p. 23.
- affinis* Rud., 1819, t.h. *Fringilla* sp. [Fil.]. Diplotriæna, p. 433.
- affinis* Seurat, 1916, t.h. *Strix flammea*. Acuarua, p. 328.
- africana* Gedoelst, 1916, t.h. *Cinixys erosa*. Labiduris, p. 247.
- africana* Gendre, 1909, t.h. *Cinixys belliana*. [Het.]. Africana, p. 225.
- africana* Lane, 1921, t.h. African elephant. Quilonia, p. 73.
- africana* Lane, 1921, t.h. African elephant. [Pteridopharynx]. Murshidia, p. 79.
- africana* Monnig, 1924, t.h. *Paraxerus cepapi*, etc. [Leptosoma]. Physaloptera, p. 352.
- africana* Neveu Lemaire, 1924, t.h. African rhinoceros. Buissonia, p. 81.
- africana* Thapar, 1924, t.h. *Rhinoceros africanus*. Kiluluma, p. 71.
- africanum* Baylis, 1921, t.h. *Elephas africanus*. Parabronema, p. 337.
- africanum* Taylor, 1924, t.h. *Bufo regularis*. Amplicæum, p. 279.
- africanus* Jägerskiöld, 1909, t.h. *Ardea goliath*, etc. Eustrongylides, p. 179.
- \**africanus* Looss, 1911, t.h. *Anthropopithecus troglodytes*. Necator, p. 99.
- agamæ* Macfie, 1924, t.h. *Agama colonorum*. Saurositus, p. 409.
- agamæ* Rodhain, 1906, t.h. *Agama colonorum*. [Fil.]. Foleyella, p. 395.
- agilis* Wedl, 1862, t.h. *Crocodilus vulg.* [Asc.]. Multicæum, p. 284.
- agoutis* Neiva, Cunha, and Travassos, 1914, t.h. *Dasypsecta agouti*. Heligmosomum, p. 142.
- alæuris* Thapar, 1925, t.h. *Testudo ibera*. Alæuris, p. 203.
- \**alata* Bellingham, 1839, t.h. *Homo*. [Asc.]. Toxocara, p. 258.
- alata* Railliet and Henry, 1909, t.h. *Macaque*. Cooperia, p. 132.
- alata* Rud., 1819, t.h. *Ardea nigra*. [Spiropt.]. Acuarua, p. 328.
- alata* Rud., 1819, t.h. *Falco nisus*, etc. Physaloptera, p. 353.
- \**alata* Rud., 1819, of Stoss., 1889, t.h. *Nisus communis*, etc. Physaloptera, p. 354.
- alata* Schneider, 1866, t.h. *Tinamus* sp. Heterakis, p. 216.
- alata* var. *chevreuxi* Seurat, 1914, t.h. hawk. Physaloptera, p. 353.
- alata* var. *nouveli* Seurat, 1915, t.h. *Accipiter nisus*, *Aquila chrysaetos*. Physaloptera, p. 353.
- alatus* Leuckart, 1848, t.h. *Monodon monoceros*. [Str.]. Stenurus, p. 170.
- \**alatus* Molin, 1860, t.h. *Alca torda*, etc. Cosmocephalus, p. 338.
- alatus* Wedl, 1862, t.h. *Uromastix spinipes*. Thelandros, p. 192.
- \**alba* Stoss., 1902, t.h. *Cyclodus boddaerti*. Physaloptera, p. 353.
- \**albanica* Stoss., 1898, t.h. *Testudo græca*. [Oxyuris]. Mehdiella, p. 201.
- alcocki* Linstow, 1906, t.h. *Cervus eldi*. [Trichoc.]. Trichuris, p. 22.
- alfortensis* Railliet and Henry, 1910, t.h. *Bos taurus*. Thelazia, p. 318.
- allodapa* Creplin, 1853, t.h. *Dicholophus cristatus*. [Oxyuris]. Allodapa, p. 229.
- aloisii-sabaudie* Parona, 1907, t.h. *Agama atricollis*. Physaloptera, p. 353.
- alpha* Travassos, 1918, t.h. *Muridæ*. Heligmosomum, p. 142.
- alveatum* Looss, 1900, t.h. *Equus* (donkey). [Cyathost.]. Trichonema, p. 55.
- ambigua* Rud., 1819, t.h. *Lepus cuniculus*, *L. timidus*. [Oxyuris]. Passalurus, p. 185.
- amblymorpha* Drasche, 1883, t.h. *Caprimulgus campestris*. [Heterakis]. Ascaridia, p. 266.
- americana* Stiles, 1902, t.h. *Homo*. [Unc.]. Necator, p. 98.
- americanum* Railliet, 1918, t.h. *Asio accipitrinus*. Contortospiculum, p. 430.
- americanum* Schwartz, 1925, t.h. *Scalopus aquaticus*. Porrocaum, p. 280.
- americanus* Chapin, 1925, t.h. *Buteo borealis*. Syngamus, p. 157.
- americanus* Chapin, 1925, t.h. *Castor canadensis*. Travassosius, p. 131.



- americanus* Magath, 1919, t.h. tortoises. Camallanus, p. 378.
- amphiacanthum* Dies., 1851, t.h. Lemmus dasytrichus. [Ophiost.]. Rictularioides, p. 346.
- amphibia* Linstow, 1899, t.h. Rana macrodon. Physaloptera, p. 353.
- anacanthura* Molin, 1860, t.h. Crotophaga ani, C. major. [Spiropt.]. Oxyspirura, p. 320.
- \**anatinum* Skrjabin, 1916, t.h. Anas boschas. Epomidiostomum, p. 155.
- anatis* Schrank, 1790, t.h. Anas querquedula. [Trichoc.]. Capillaria, p. 24.
- ancylodirus* Ward and Magath, 1916, t.h. German carp. Camallanus, p. 378.
- andersoni* Cobbold, 1876, t.h. Sciurus sp. [Asc.]. Subulura, p. 227.
- andersoni* Vevers, 1923, t.h. Florida cærulea. Contracæcum, p. 282.
- androphora* Nitzsch, 1821, t.h. Triton tæniatus. [Asc.]. Hedruris, p. 375.
- angusticollis* Molin, 1860, t.h. Falco haliaëtus, F. buteo. [Asc.]. Porroecæcum, p. 289.
- angustum* Duj., 1845, t.h. Fringilla cœlebs. [Trichosomum]. Capillaria, p. 25.
- anisa* Khalil, 1922, t.h. African elephant. [Pteridopharynx]. Murshidia, p. 79.
- annandalei* Baylis and Daubney, 1922, t.h. Testudo travancorica. Zanclophorus, p. 241.
- annulata* Baylis and Daubney, 1922, t.h. Chitra indica. Spiroxyss, p. 304.
- annulatus* Molin, 1860, t.h. Labrax lupus. [Lecanoc.]. Gœzia, p. 285.
- annulosum* Duj., 1845, t.h. Mus rattus. [Calodium]. Capillaria, p. 25.
- anolabiata* Molin, 1860, t.h. Crax fasciolata. [Spiropt.]. Thelazia, p. 318.
- anomala* Linstow, 1904, t.h. Tropidonotus piscator. [Het.]. Tanqua, p. 341.
- anomala* Molin, 1860, t.h. Felis onça. Physaloptera, p. 353.
- anoura* Duj., 1845, t.h. Python bivittatus. [Asc.]. Polydelphis, p. 265.
- anseris* Schwartz, 1925, t.h. Anser domesticus. Ascaridia, p. 266.
- \**anseris* Zeder, 1800, in part, t.h. Anser. [Str.]. Amidostomum, p. 153.
- \**anseris* Zeder, 1800, in part, t.h. Anser. [Str.]. Epomidiostomum, p. 156.
- \**anseris* (Zeder, 1800) Railliet and Henry, 1909, in part, t.h. Anser. [Str.]. Amidostomum, p. 154.
- antarctica* Leiper and Atkinson, 1914, t.h. Mustelus antarcticus. [Terranova]. Porroecæcum, p. 280.
- antarctica* Linstow, 1899, t.h. Acanthophis antarctica, Cyclodus occipitalis. Physaloptera, p. 353.
- antarctica* var. *antarctica* Irwin-Smith, 1922, t.h. Tiliqua scincoides. Physaloptera, p. 353.
- antarctica* var. *lata* Irwin-Smith, 1922, t.h. Tiliqua scincoides. Physaloptera, p. 353.
- anthicola* Linstow, 1903, t.h. Anthus richardi. [Fil.]. Aprocta, p. 405.
- anthochæra* Johnston, 1912, t.h. Anthochæra carunculata. [Ceratospira]. Oxyspirura, p. 320.
- anthropopetheci* Gedoelst, 1916, t.h. chimpanzee. [Oxy.]. Enterobius, p. 188.
- anthuris* Rudolphi, 1819, t.h. Coracias garrula, Oriolus galbula. [Spiropt.]. Acuaria, p. 328.
- anulata* Molin, 1860, t.h. Ophis saurocephalus. [Het.]. Subulura, p. 227.
- apiensis* Gedoelst, 1916, t.h. African elephant. [Evansia]. Quilonia, p. 73.
- apiostomum* Willach, 1891, t.h. Macacus cynomolgus. [Sclerostomum]. Eso-phagostomum, p. 87.
- appendiculatus* Molin, 1861, t.h. Coluber lichtensteinii. Kalicephalus, p. 114.
- \**apri* Gmelin, 1790, t.h. pig. [Trichoc.]. Trichuris, p. 23.
- \**apri* Gmelin, 1790, in part, t.h. Sus scrofa. [Asc.]. Metastrongylus, p. 160.
- \**aquillæ* Smith, Fox, and White, 1908, t.h. Haliaëtus leucoc. [Asc.]. Contracæcum, p. 282.
- ararath* Massino, 1924, t.h. Emys orbicularis. Zanclophorus, p. 241.
- araxiana* Massino, 1924, t.h. Emys orbicularis. [Falcaustra]. Spironoura, p. 239.
- arcticus* Cobb, 1888, t.h. Beluga leucas. [Str.]. Stenurus, p. 170.
- \**arcuata* Gedoelst, 1916, t.h. heron. [Kathleena]. Contracæcum, p. 282.

- \**ardæ* Smith, Fox, and White, 1908, t.h. *Ardea herodias*. [Asc.]. Porrocæcum, p. 281.
- armata* Perrier, 1871, t.h. *Emys picta*. Hedruris, p. 376.
- armatus* Blanc, 1912, t.h. *Macacus cynomolgus*. Streptopharagus, p. 312.
- \**armatus* Rud., 1802, t.h. *Equus cab.* Strongylus, p. 37.
- \**armatus* Zeder, 1800, t.h. *Perca vulg.* [Cucullanus]. Camallanus, p. 378.
- \**armatus* Zeder, 1803, t.h. *Silurus glanis*. [Cochlus.]. Gœzia, p. 285.
- armenica* Massino, 1924, t.h. *Emys orbicularis*. [Falecaustra]. Spironoura, p. 239.
- armillata* Railliet and Henry, 1909, t.h. *Bos.* Onchocerca, p. 414.
- arnfieldi* Cobbold, 1884, t.h. *Equus asinus*. [Str.]. Dietyocaulus, p. 162.
- arquata* Schneider, 1866, t.h. *Crypturus cupreus*. Heterakis, p. 216.
- artemisia* Schmerling, 1925, t.h. *Coracias garrula*. Diplotriæna, p. 433.
- arthricola* Skrjabin, 1916, t.h. *Alcedo* sp. Politospiculum, p. 398.
- ascaroides* Hall, 1916, t.h. *Geomys breviceps*. Protospirura, p. 305.
- ascaroides* Geze, 1782, t.h. *Silurus glanis*. [Cucullanus]. Gœzia, p. 285.
- \**ashworthi* Le Roux, 1924, t.h. Equines. Trichonema, p. 56.
- asini* Boulenger, 1920, t.h. Equines. Strongylus, p. 37.
- asmilium* Railliet, Henry, and Joyeux, 1913, t.h. *Cercopithecus callitrichus*, *C. patas*. [Characost.]. Globocephalus, p. 49.
- asperum* Railliet and Henry, 1913, t.h. goat. Œsophagostomum, p. 87.
- asturis* n.sp., t.h. *Astur tachino*. Cosmocephalus, p. 337.
- asymmetrica* Ware, 1925, t.h. *Cervus dama*. Ostertagia, p. 125.
- asymmetricum* Theiler, 1923, t.h. Equines. [Cylicostomum]. Trichonema, p. 55.
- attenuata* Molin, 1858, t.h. *Pithon tigris*. [Asc.]. Polydelphis, p. 266.
- \**attenuata* Molin, 1858, of Linstow, 1899, t.h. *Coluber cabella*, *Python* spp. [Asc.]. Polydelphis, p. 265.
- \**attenuata* Molin, 1858, of Stoss., 1896, t.h. *Boa constrictor*. [Asc.]. Polydelphis, p. 265.
- attenuata* Molin, 1859, t.h. *Leuciscus cavedanus*. [Daenitis]. Cucullanus, p. 382.
- attenuata* Rud., 1819, t.h. *Hirundo urbica*, etc. [Spiropt.]. Acuaris, p. 328.
- \**attenuata* Rud., 1819, in part, not Rud., 1803, not Zeder, 1803, t.h. *Corvus cornix*. [Fil.]. Diplotriæna, p. 434.
- \**attenuata* Rud., 1819, in part, not Rud., 1803, not Zeder, 1803, t.h. *Falco peregrinus*. [Fil.]. Serratospiculum, p. 428.
- attenuato-verrucosa* Molin, 1858, t.h. *Thamnophilus canadensis*. [Fil.]. Diplotriæna, p. 433.
- attenuatus* Leidy, 1856, t.h. *Cynocephalus porcaris*. [Str.]. Œsophagostomum, p. 87.
- \**attenuatus* Molin, 1860, not Leidy, 1856, t.h. *Dicotyles albirostris*. [Str.]. Hyostrongylus, p. 121.
- aucta* Rud., 1802, t.h. *Blennius viviparus*. [Asc.]. Contracæcum, p. 282.
- auliatina* Skrjabin, 1916, t.h. *Hæmatopus ostralegus*. Schistorophus, p. 367.
- \**auricularis* Leidy, 1856, not Zeder, 1800, t.h. *Bufo americanus*, *Cistudo carolina*. [Str.]. Oswaldocruzia, p. 127.
- \**auricularis* Zeder, 1800, t.h. *Rana temp.* [Str.]. Oswaldocruzia, p. 127.
- auriculatum* Looss, 1900, t.h. *Equus* (donkey). [Cyathost.]. Trichonema, p. 55.
- auritæ* Travassos, 1914, t.h. *Didelphys aurita*. Capillaria, p. 25.
- australis* Linstow, 1897, t.h. *Petrogale penicillata*. [Fil.]. Dipetalonema, p. 426.
- australis* Linstow, 1898, t.h. *Macropygia nigrirostris*. [Het.]. Ascaridia, p. 267.
- australis* n.sp. t.h. *Macropus* sp. Macropostrongylus, p. 75.
- auziensis* Seurat, 1917, t.h. *Scincus officinalis*. Pharyngodon, p. 194.
- azei* Cobbold, 1879, t.h. *Equus asinus*. [Str.]. Trichostrongylus, p. 119.
- aziza* Khalil, 1922, t.h. African elephant. [Memphisia]. Murshidia, p. 79.

*bacillatum* Eberth, 1863, t.h. *Mus musculus*. [Trichosoma]. Capillaria, p. 25.

*balanocephala* Gendre, 1922, t.h. *Merops malinbicus*. [Spiropt.]. Torquatella, p. 373.

- bancrofti* Cobbold, 1877, t.h. Homo. [Fil.]. Wuchereria, p. 401.
- bancrofti* Johnston, 1912, t.h. Cathetus lathami. Heterakis, p. 216.
- barbatum* Smit and Notosædiro, 1923, t.h. Equines. [Cylicost.]. Trichonema, p. 55.
- barbi* Baylis, 1923, t.h. Barbus bynni. Cucullanus, p. 382.
- barbi* Baylis and Daubney, 1922, t.h. Barbus tor. [Falconia]. Spironoura, p. 239.
- bargusina* Skrjabin, 1917, t.h. Turdus sp. Diplotriena, p. 434.
- baylisi* Skrjabin, 1924, t.h. Sperophilopsis leptodactylus. Dermatopallarya, p. 212.
- bentocruzi* Barreto, 1919, t.h. Trogon spp. Subulura, p. 227.
- beramporia* Lane, 1914, t.h. dom. fowl. Heterakis, p. 216.
- bernardi* Railliet and Henry, 1911, t.h. pig. Setaria, p. 423.
- beta* Travassos, 1918, t.h. Muridæ. Heligmosomum, p. 142.
- bialatus* Molin, 1861, t.h. Pelophylax escul. [Str.]. Oswaldocruzia, p. 127.
- \**bicolor* Baird, 1868, t.h. Trichechus rosmarus. [Asc.]. Anisakis, p. 273.
- bicoronata* Linstow, 1901, t.h. Adenota sp. [Fil.]. Setaria, p. 423.
- bicoronatum* Looss, 1900, t.h. Equus (donkey). [Cyathost.]. Trichonema, p. 55.
- \**bicostatus* Linstow, 1906, t.h. Phœna communis. [Pseudalis]. Tornyurus, p. 171.
- bicuspis* Rud., 1819, t.h. Tringa helvetica. [Spiropt.]. Schistorophus, p. 367.
- bicuspis* Wedl, 1855, t.h. Scyllium catulus. [Asc.]. Acanthocheilus, p. 288.
- bidens* Rud., 1819, t.h. Merops apiaster. [Spiropt.]. Schistorophus, p. 367.
- bidentata* Linstow, 1899, t.h. Acipenser ruthenus. [Asc.]. Contracæcum, p. 282.
- bidentata* Molin, 1858, t.h. Cervus nambi, etc. [Fil.]. Setaria, p. 423.
- bidentatum* Ihle, 1925, t.h. Equines. [Cylicost.]. Trichonema, p. 55.
- bifida* Molin, 1858, t.h. Dactylomys amblyonyx. [Fil.]. Dicheilonema, p. 438.
- bifurcatum* Hall, 1916, t.h. Citellus elegans. Citellinema, p. 152.
- bifurcatus* Sleggs, 1925, t.h. Citellus richardsonii. Warrenius, p. 151.
- \**bifurcatus* Theobald, 1896, t.h. poultry. Syngamus, p. 157.
- bifurcus* Creplin, 1849, t.h. Cercopithecus ruber. [Str.]. Œsophagostomum, p. 87.
- bilabiata* Creplin, 1829, t.h. Lanius minor. Physaloptera, p. 353.
- \**bilabiata* Molin, 1860, t.h. Mus brasiliensis. [Spiropt.]. Physaloptera, p. 354.
- bilabiatus* Molin, 1860, t.h. Eurypyga helias. [Ancyrananthus]. Ancyrananthopsis, p. 369.
- binansata* Railliet and Henry, 1913, t.h. Dasypus villosus. Aspidodera, p. 220.
- bipapillata* Godeolst, 1916, t.h. monkey. [Oxy.]. Enterobius, p. 188.
- \**biramusum* Cuillé, Marotel, and Panisset, 1911, t.h. cattle. Œsophagostomum, p. 87.
- bisonis* Chapin, 1925, t.h. Bison bison. Ostertagia, p. 125.
- bisonis* Cram, 1925, t.h. Bison bison. Cooperia, p. 132.
- bispinosa* Molin, 1860, t.h. Scineus officialis. [Tropidocerca]. Tetrameres, p. 361.
- bispinosus* Molin, 1860, t.h. Cervus nambi. [Str.]. Hæmonchus, p. 123.
- blanchardi* Railliet and Henry, 1912, t.h. Orang outan. Œsophagostomum, p. 87.
- \**blasii* Linstow, 1887, t.h. Lepus cuniculus ferox. [Str.]. Graphidium, p. 135.
- \**blomei* Travassos, 1914, t.h. Tetrao urogallus. Capillaria, p. 27.
- boæ* R. Blanchard, 1886, t.h. Boa constrictor. [Ankylostoma]. Kalicephalus, p. 114.
- boddaërtii* Baird, 1860, t.h. Herpetodryas boddaërtii. [Asc.]. Polydelphis, p. 266.
- bombinatoris* Linst., 1892, t.h. Bombinator igneus. [Trichosoma]. Capillaria, p. 25.
- bonnei* Ortlepp, 1922, t.h. "Sapakara." Physaloptera, p. 353.
- bonnei* Ortlepp, 1924, t.h. rat. Protospirura, p. 305.
- bonnei* Thiel, 1925, t.h. Mycetes seniculus. Syphacia, p. 196.
- bonnei* Thiel, 1925, t.h. Mycetes seniculus. Squamanema, p. 316.
- boopis* Baylis, 1920, t.h. Megaptera nodosa. Crassicauda, p. 437.
- borealis* Linst., 1884, t.h. Lagopus mutus. [Het.]. Ascaridia, p. 267.
- borreli* Sambon, 1925, t.h. Mus musculus. Muspicea, p. 446.
- bosei* Chandler, 1924, t.h. Dissemurus paradiseus. [Fil.]. Chandlerella, p. 411.
- bosei* Lane, 1914, t.h. Ceriornis satyra. Heterakis, p. 216.
- bothropis* Molin, 1861, t.h. Bothrops jararaca. Kalicephalus, p. 114.
- boneti* Gendre, 1911, t.h. Xerus erythropus. [Het.]. Oxynema, p. 231.

- boularti* Mégnin, 1844, t.h. *Casuarus galeatus*. [Sclerost.]. *Syngamus*, p. 157.
- boveri* R. Blanchard, 1866, t.h. *Vespertilio murinus*. *Rictularia*, p. 345.
- \**bovis* Baillet, 1858, t.h. *Bos taurus*. [Fil.]. *Thelazia*, p. 318.
- bovis* Piettre, 1912, t.h. *Bos taurus*. *Onchocerca*, p. 414.
- bovis* Schnyder, 1906, t.h. *Bos taurus*. [Trichosoma]. *Capillaria*, p. 25.
- \**bovis* Schnyder, 1906, t.h. *Bos taurus*. *Œsophagostomum*, p. 87.
- bozasi* Neveu-Lemaire, 1924, t.h. *Afr. rhinoceros*. [Henryella]. *Murshidia*, p. 79.
- brachylaemus* Linstow, 1901, t.h. *Heterohyrax mossambica*. [Deletrocephalus]. *Theileriana*, p. 77.
- brachyurum* Ward and Magath, 1916, t.h. black bass. [Hysterothylacium]. *Raphidascaris*, p. 275.
- brasiliiana* Linstow, 1899, t.h. *Perdix* sp. [Het.]. *Ascaridia*, p. 267.
- brasiliiana* Stossich, 1897, t.h. *Picus* sp. [Fil.]. *Hamatospiculum*, p. 395.
- brasiliensis* Magalhães, 1892, t.h. *Gallus dom.* [Het.]. *Ascaridia*, p. 268.
- braziliense* de Faria, 1910, t.h. *Felis dom.* [Ancylostomum]. *Ancylostoma*, p. 92.
- braziliense* Travassos, 1914, t.h. *Mus decumanus*. *Heligmosomum*, p. 142.
- breve* Linstow, 1877, t.h. *Totanus fuscus*. [Trichosoma]. *Capillaria*, p. 25.
- brevicapsulatum* Ihle, 1920, t.h. Equines. [Cylicost.]. *Trichonema*, p. 55.
- brevicauda* Boulenger, 1916, t.h. *Equus* cab. *Triodontophorus*, p. 45.
- brevicauda* Khalil, 1922, t.h. African elephant. *Quilonia*, p. 73.
- brevicauda* Leiper, 1911, t.h. zebra. *Cylindropharynx*, p. 64.
- brevicauda* Linstow, 1906, t.h. *Francolinus adpersus*. *Physaloptera*, p. 353.
- brevicauda* Rätz, 1897, t.h. *Lucioperca sandra*. [Het.]. *Ascaridia*, p. 268.
- brevicauda* Thapar, 1925, t.h. *Rhinoceros africanus*. *Kiluluma*, p. 71.
- brevicaudata* Müller, 1894, t.h. *Agama colonum*. *Strongyluris*, p. 222.
- brevicaudata* Zeder, 1800, t.h. *Rana bufa*. [Fus.]. *Aplectana*, p. 208.
- \**brevicaudatum* Schneider, 1866, t.h. *Rana temp.* [Oxysoma]. *Oxysomatium*, p. 204.
- brevicaudatus* Baylis and Daubney, 1923, t.h. *Rhinoceros indicus*. *Crossocephalus*, p. 250.
- brevicaudatus* Cobb, 1898, t.h. *Macropus* sp. *Zoniolaemus*, p. 176.
- brevicaudatus* Duj., 1845, t.h. *Ardea stellaris*. [Disph.]. *Acuaria*, p. 328.
- \**brevicolle* Rud., 1819, t.h. *Anser*, *Anas querquedula*. [Trichos.]. *Capillaria*, p. 25.
- brevipenis* Molin, 1860, t.h. *Dicholophus margravi*. [Spiropt.]. *Oxyspirura*, p. 320.
- brevipenis* Molin, 1861, t.h. *Dryophis fulgidus*, etc. *Kalicephalus*, p. 114.
- brevipes* Ransom, 1911, t.h. *Ovis aries*. *Capillaria*, p. 25.
- brevispiculum* Chapin, 1924, t.h. *Testudo denticulata*. *Angusticaecum*, p. 279.
- brevispiculum* Gendre, 1911, t.h. *Gallus gallinaceus*, etc. *Heterakis*, p. 216.
- brevispiculum* Linstow, 1873, t.h. *Blicca bjærkna*. [Trichosoma]. *Capillaria*, p. 25.
- brevispiculum* Linstow, 1906, t.h. *Felis rubiginosa*. *Physaloptera*, p. 353.
- brevispiculum* Seurat, 1914, t.h. *Dipodilla campestris*. *Gongylonema*, p. 314.
- brevisubulata* Molin, 1860, t.h. *Strix atricapilla*. [Spiropt.]. *Oxyspirura*, p. 320.
- brevivaginata* Seurat, 1917, t.h. *Vespertilio kuhli*. *Physaloptera*, p. 353.
- brevivaginata* Thapar, 1925, t.h. *Rhinoceros africanus*. *Kiluluma*, p. 71.
- \**brevivaginatus* Railliet and Henry, 1907, t.h. *Sus scrofa dom.* *Metastrongylus*, p. 160.
- brigantiaca* Blanchard, 1909, t.h. *Rupicapra rupicapra*. *Ostertagia*, p. 125.
- britannica* Skrjabin, 1916, t.h. *Agama* sp. *Physaloptera*, p. 353.
- brodeni* Gedoelst, 1916, t.h. *Chamaeleon gracilis*. [Het.]. *Africana*, p. 225.
- bronchialis* Muehlig, 1884, t.h. *Anser* sp. *Syngamus*, p. 157.
- brumpti* Neveu-Lemaire, 1924, t.h. *Rhinoceros bicornis*. *Paraquilonia*, p. 75.
- brumpti* Railliet and Henry, 1905, t.h. *Homo*. *Œsophagostomum*, p. 87.
- \**bufonis* Gedoelst, 1916, t.h. large toad. [Asc.]. *Ampliacum*, p. 279.
- \**bufonis* Leiper, 1908, t.h. *Bufo regularis*. [Fil.]. *Foleyella*, p. 395.
- bufonis* Schrank, 1788, t.h. *Rana* sp., *Bufo* sp. [Asc.]. *Rhabdias*, p. 18.
- bulbosa* Lane, 1916, t.h. *Caranx melampygus*. *Bulbodacnitis*, p. 383.
- bulbosa* Linstow, 1899, t.h. *Scincus ocellatus*. [Oxyuris]. *Thelandros*, p. 193.

- bulbosa* Linstow, 1906, t.h. *Pavo spicifer*. [Physaloptera]. *Cyrnea*, p. 300.
- bullosa* Ransom and Hall, 1912, t.h. *Ovis aries*. *Ostertagia*, p. 125.
- cæcutiens* Brumpt, 1919, t.h. *Homo*. *Onchocerca*, p. 414.
- cælum* Linstow, 1904, t.h. *Cephalobus sylvaticultor*. [Fil.]. *Setaria*, p. 423.
- cahirensis* Jaegerskiöld, 1904, t.h. cat. *Rictularia*, p. 345.
- calamiformis* Schneider, 1866, t.h. *Psittacus æstivus*. [Fil.]. *Pelecitus*, p. 411.
- calcarata* Gendre, 1909, t.h. *Numida meleagris*. [Het.]. *Ascaridia*, p. 268.
- calcaratus* Molin, 1860, t.h. *Ibis guarauna*. [Disph.]. *Echinuria*, p. 331.
- calcaratus* Ransom, 1911, t.h. *Lepus sylvaticus*. *Trichostrongylus*, p. 119.
- \**calicatiforme* Kotlán, 1919, t.h. Equines. [Cylicost.]. *Trichonema*, p. 56.
- calicatum* Looss, 1900, t.h. *Equus cab.* [Cyathost.]. *Trichonema*, p. 55.
- \**calicatum* var. *minor* Kotlán, 1920, t.h. Equines. [Cylicost.]. *Trichonema*, p. 56.
- californica* Gedoelst, 1919, t.h. *Oidemia deglandi*. [Yseria]. *Streptocara*, p. 360.
- callichroi* Stewart, 1914, t.h. *Callichrous macrophth.* [Dacnitis]. *Cucullanus*, p. 382.
- callipæda* Railliet and Henry, 1910, t.h. *Canis* fam. *Thelazia*, p. 318.
- callis* Travassos, 1914, t.h. *Didelphys aurita*. [Trichostr.]. *Ostertagia*, p. 125.
- calotis* Baylis and Daubney, 1923, t.h. *Calotes nigrilabris*. *Strongyluris*, p. 222.
- \**cameli* Romanovitch, 1916, t.h. *Camelus bactrianus*. [Deraïophoronema]. *Dipetalonema*, p. 427.
- cameli* Rud., 1819, t.h. *Camelus bactrianus*, *C. dromedarius*. [Trichoc.]. *Trichuris*, p. 22.
- campanula* Linstow, 1889, t.h. *Felis catus* dom. [Trichoc.]. *Trichuris*, p. 23.
- campanula* Linstow, 1899, t.h. *Lacerta campestris*. [Het.]. *Spinicauda*, p. 225.
- campanulata* Molin, 1858, t.h. *Falco magnirostris*. [Fil.]. *Thelazia*, p. 318.
- candzei* Fraipont, 1882, t.h. *Uromastix acanthinurus*. [Fil.]. *Foleyella*, p. 395.
- caninum* Ercolani, 1859, t.h. *Canis* fam. [Sclerost.]. *Ancylostoma*, p. 92.
- canis* Brumpt, 1922, t.h. dog. *Strongyloides*, p. 20.
- canis* Werner, 1782, t.h. *Canis* fam. [Lumbricus]. *Toxocara*, p. 258.
- \**canis bronchialis* Osler, 1877, t.h. *Canis* fam. [Str.]. *Oslerus*, p. 386.
- capensis* Monnig, 1924, t.h. *Pteroclorus namaqua*, *Pterocles bicinctus*. *Syphaciella*, p. 210.
- capensis* Ortlepp, 1922, t.h. *Xerus setosus*. *Physaloptera*, p. 353.
- \**capillaris* Dunglison, 1895, t.h. *Homo*. [Vermiculus]. *Dracunculus*, p. 442.
- capillaris* Molin, 1860, t.h. *Sterna hirundo*. [Spiropt.]. *Schistorophus*, p. 367.
- capillaris* Mueller, 1889, t.h. *Ovis aries*. [Pseudaluis]. *Synthetocaulus*, p. 164.
- \**capillaris* Rud., 1809, t.h. *Anser*, *Anas querquedula*. [Trichoc.]. *Capillaria*, p. 25.
- capitatus* Looss, 1900, t.h. *Equus mulus*. *Gyalocephalus*, p. 62.
- capitatus* Molin, 1860, t.h. *Falco minutus*. [Disph.]. *Acuaria*, p. 328.
- capræ* Linstow, 1883, t.h. *Capra hircus*. [Fil.]. *Onchocerca*, p. 414.
- capricola* Ransom, 1907, t.h. goats, sheep. *Trichostrongylus*, p. 119.
- caprimulgi* Rud., 1819, t.h. *Caprimulgus europæus*. [Trichosoma]. *Capillaria*, p. 25.
- \**capsularia* Rud., 1802, t.h. *Salmo salar*. [Asc.]. *Porrocaecum*, p. 280.
- capsulata* Annett, Dutton, and Elliott, 1901, t.h. *Pycnonotus barbatus*, etc. [Fil.]. *Eufilaria*, p. 407.
- carbonis* Rud., 1819, t.h. *Pelecanus carbo*. [Trichosoma]. *Capillaria*, p. 25.
- carette* Baylis, 1923, t.h. *Thalassochelys caretta*. *Cucullanus*, p. 382.
- carlieri* Gedoelst, 1916, t.h. *Cricetomys gambianus*. *Trichuris*, p. 23.
- carlosi* Barreto, 1919, t.h. *Piaya cayanna*. *Subulura*, p. 227.
- cascadilla* Wigdor, 1918, t.h. minnows. *Rhabdochona*, p. 325.
- castoris* Chapin, 1925, t.h. *Castor canadensis*. *Castorstrongylus*, p. 47.
- catheturinus* Johnston, 1912, t.h. *Catheturus lathamii*. [Het.]. *Ascaridia*, p. 268.
- \**cati* Schrank, 1788, in part, t.h. *Felis* dom. [Asc.]. *Toxocara*, p. 258, and *Toxascaris*, p. 260.
- catinatum* Looss, 1900, t.h. *Equus*. [Cyathost.]. *Trichonema*, p. 55.

- catinatum* var. *litoraurea* Yorke and Macfie, 1920, t.h. Equines. [Cylicost.]. *Trichonema*, p. 55.
- catinatum* var. *pseudocatinata* Yorke and Macfie, 1919, t.h. Equines. [Cylicost.]. *Trichonema*, p. 55.
- caucasica* Linstow, 1902, t.h. *Homo sapiens*. *Physaloptera*, p. 353.
- caudata* Linstow, 1906, t.h. *Lampronessa sponsa*. *Heterakis*, p. 216.
- \**caudispina* Molin, 1858, t.h. *Ateles variegatus*, etc. [Fil.]. *Dipetalonema*, p. 425.
- cayugensis* Wigdor, 1918, t.h. *Esox americanus*. [Hysterothylacium]. *Raphidas-caris*, p. 275.
- cebi* Ortlepp, 1923, t.h. *Cebus fatuellus*. *Physaloptera*, p. 353.
- cebus* Darling, 1911, t.h. *Cebus hypoleucus*. *Strongyloides*, p. 20.
- cephaloptera* Molin, 1860, t.h. *Momotus braziliensis*. [Spiropt.]. *Oxyspirura*, p. 320.
- \**cernuus* Creplin, 1829, t.h. *Ovis aries*. [Str.]. *Bunostomum*, p. 109.
- certa* Leidy, 1866, t.h. *Diomedea exulans*. [Tropidocerca]. *Tetrameres*, p. 361.
- cervicalis* Railliet and Henry, 1910, t.h. *Equus cab.* *Onchocerca*, p. 414.
- \**cervicornis* McFadyean, 1897, t.h. *Ovis aries*. [Str.]. *Ostertagia*, p. 125.
- cervinus* Baylis and Daubney, 1922, t.h. *Cervus axis*. *Hæmonchus*, p. 123.
- cesticillata* Sonsino, 1889, t.h. *Megalotis cerdo*. *Physaloptera*, p. 353.
- \**ceylanicum* Looss, 1911, t.h. *Viverricula malaccensis*. [Agchylostoma]. *Ancylostoma*, p. 92.
- chamæleonis* Baylis and Daubney, 1922, t.h. *Chamæleon vulgaris*. *Strongyluris*, p. 222.
- chamæleonis* Skrjabin, 1916, t.h. *Chamæleontidæ*. [Angiost.]. *Rhabdias*, p. 18.
- chamæleontis* Gedoelst, 1916, t.h. *Chamæleon gracilis*. *Physaloptera*, p. 353.
- chamoensis* (Parona) Henry and O'Zoux, 1909, t.h. ? [Fil.]. *Diplotriæna*, p. 434.
- \**chapini* Boulenger, 1923, t.h. *Cistudo carolina*. [Falcaustra]. *Spirooura*, p. 239.
- charadrii* Rud., 1819, t.h. *Charadrius minor*, *C. himantopus*. [Trichosoma]. *Capillaria*, p. 25.
- chenonettæ* Johnston, 1912, t.h. *Chenonetta jubata*. *Heterakis*, p. 216.
- chevreuxi* Seurat, 1913, t.h. *Felis ocreata*. *Habronema*, p. 297.
- chevreuxi* Seurat, 1918, t.h. *Himantopus himantopus*. *Amidostomum*, p. 154.
- chlamydosauri* Breinl, 1913, t.h. *Chlamydosaurus kingii*. [Fil.]. *Foleyella*, p. 395.
- \**chrisoptera* Molin, 1858, t.h. *Tapirus americanus*. [Spiropt.]. *Physocephalus*, p. 309.
- chrysanthemoides* Skrjabin, 1916, t.h. *Bufo* sp. *Orneoascaris*, p. 264.
- chrysotidis* Walter, 1866, t.h. *Chrysotis amazonicus*. [Trichosoma]. *Capillaria*, p. 25.
- ciconiæ* Schrank, 1788, t.h. *Ciconia nigra*. [Fil.]. *Contortospiculum*, p. 430.
- \**cincinnati* Ercolani, 1866, t.h. *Equus cab.*, *E. asinus*. [Spiropt.]. *Onchocerca*, p. 414.
- cincta* Linstow, 1897, t.h. *Stellio vulg.* [Oxyuris]. *Thelandros*, p. 193.
- cinctus* Linstow, 1898, t.h. *Perameles obesula*. [Hoploc.]. *Echinonema*, p. 348.
- circularis* Linstow, 1897, t.h. *Mus rattus*. *Physaloptera*, p. 353.
- circularis* Linstow, 1903, t.h. *Centropus sinensis*. [Het.]. *Ascaridia*, p. 268.
- circularis* Molin, 1860, t.h. *Corvus cyanomelas*, etc. [Spiropt.]. *Pelecitus*, p. 412.
- circumcinctus* Stadelmann, 1894, t.h. *Ovis aries*. [Str.]. *Ostertagia*, p. 125.
- circumvallata* Linstow, 1906, t.h. *Cygnus atratus*. *Heterakis*, p. 216.
- cirrata* Linstow, 1906, t.h. *Iguana tuberculata*. [Oxyuris]. *Ozolaimus*, p. 191.
- cirratu* Mueller, 1777, t.h. *Gadus morrhua*, etc. *Cucullanus*, p. 381.
- cirrohamata* Linstow, 1888, t.h. *Phalacrocorax verucosus*. [Fil.]. *Streptocara*, p. 360.
- cirrura* Leidy, 1866, t.h. *Quiscalus major*. [Fil.]. *Thelazia*, p. 318.
- citilli* Rud., 1819, t.h. *Arctomys citillus*. [Spiropt.]. *Physaloptera*, p. 353.
- clarotis* Baylis, 1923, t.h. *Clarotes laticeps*, *Synodontis schaal*. *Cucullanus*, p. 382.
- clathratum* Baird, 1868, t.h. *Loxodonta africana*. [Sclerost.]. *Grammocephalus*, p. 104.

- \**clathratum* ♀ Baird, 1868, t.h. *Loxodonta africana*. [Sclerost.]. *Parabronema*, p. 337.
- \**clathratus* (Baird, 1868) of Railliet and Henry, 1910, t.h. *Elephas indicus*. *Grammocephalus*, p. 104.
- clausa* Rudolphi, 1819, t.h. *Erinaceus europæus*. *Physaloptera*, p. 352.
- clavata* Rud., 1809, t.h. *Gadus barbatus*. [Asc.]. *Contracæcum*, p. 282.
- clitellarius* Ward and Magath, 1916, t.h. *Acipenser rubicundus*. *Cucullanus*, p. 383.
- coccinea* Seurat, 1914, t.h. *Phœnicopterus roseus*. [Tropidocerca]. *Tetrameres*, p. 361.
- cochleariæ* Travassos, 1917, t.h. *Canceroma cochlearia*. *Tetrameres*, p. 361.
- coelebs* Linstow, 1897, t.h. *Centetes ecaudatus*. *Physaloptera*, p. 353.
- coelebs* Schlotthauber, 1860, t.h. *Falco lagopus*. *Syngamus*, p. 157.
- colaptes* Walton, 1923, t.h. *Colaptes auratus luteus*. *Habronema*, p. 297.
- collare* Linstow, 1873, t.h. *Gallus dom.* [Trichosoma]. *Capillaria*, p. 25.
- collaris* Hemprich and Ehrenberg, 1828, t.h. *Hyrax capensis*. *Crossophorus*, p. 287.
- coloradensis* Hall, 1916, t.h. *Eutamias quadrivittatus*. *Rictularia*, p. 345.
- colubri* Ortlepp, 1923, t.h. colubrine snake. *Kalicephalus*, p. 114.
- colubri* Rud., 1819, t.h. *Coluber austriacus*. [Str.]. *Physaloptera*, p. 353.
- colubriformis* Giles, 1892, t.h. *Ovis aries*. *Trichostrongylus*, p. 119.
- columbæ* Gmelin, 1790, t.h. *Columba dom.* [Asc.]. *Ascaridia*, p. 268.
- columbæ* Rud., 1819, t.h. *Columba dom.* [Trichosoma]. *Capillaria*, p. 25.
- columbianum* Curtice, 1890, t.h. *Ovis aries*. *Cesophagostomum*, p. 87.
- columnaris* Leidy, 1856, t.h. *Mephitis chinga*. *Ascaris*, p. 257.
- colura* Baylis, 1919, t.h. *Lophoaëtus occipitalis*. [Asc.]. *Amplicæcum*, p. 278.
- commutata* Diesing, 1851, t.h. *Bufo viridis*. [Asc.]. *Cosmocerca*, p. 207.
- commutatus* Diesing, 1851, t.h. *Lepus timidus*. [Str.]. *Synthetocaulus*, p. 163.
- \**commutatus* Schneider, 1866, t.h. *Rana temporaria*, *R. esculenta*. [Nematoxys]. *Aplectana*, p. 208.
- compar* Schrank, 1790, t.h. *Tetrao lagopus*. [Asc.]. *Ascaridia*, p. 268.
- compressa* Schneider, 1866, t.h. *Gallus dom.* [Het.]. *Ascaridia*, p. 268.
- conepati* Solanet, 1911, t.h. *Conepatus suffocans*. [Agychlostoma]. *Ancylostoma*, p. 93.
- confusa* Travassos, 1917, t.h. *Gallus domesticus*. *Tetrameres*, p. 362.
- confusum* Sonsino, 1896, t.h. *Equus cab.* *Gongylonema*, p. 314.
- \**confusus* Railliet and Henry, 1915, t.h. *Emys* sp. *Camallanus*, p. 378.
- congeri-vulgaris* Molin, 1859, t.h. *Conger vulgaris*. [Fil.]. *Philometra*, p. 443.
- congolense* Taylor, 1925, t.h. Congo fish. *Spirooura*, p. 239.
- congolensis* Gedoelst, 1916, t.h. chimpanzee. *Necator*, p. 99.
- congolensis* Railliet and Henry, 1911, t.h. *Phacochoerus porcus*. *Setaria*, p. 423.
- conica* Drasche, 1884, t.h. *Testudo græca*. [Oxy.]. *Tachygonetria*, p. 199.
- \**connorfilii* Lane, 1922, t.h. domestic pig. *Globocephalus*, p. 49.
- conocephala* Molin, 1860, t.h. *Cuculus cayanus*. [Spiropt.]. *Torquatella*, p. 373.
- \**conocephala* Molin, 1860, of Gendre, 1921, t.h. *Centropus monachus*. [Spiropt.]. *Torquatella*, p. 373.
- conspicua* Travassos, 1914, t.h. *Didelphis opossum*. *Viannaia*, p. 149.
- constricta* Leidy, 1856, t.h. *Tropidonotus sipedon*. [Physalopt.]. *Spiroxys*, p. 304.
- contorta* Rud., 1819, t.h. *Testudo orbicularis*. [Spiropt.]. *Spiroxys*, p. 303.
- contorta* Weidman, 1913, t.h. *Dichocercus bicornis*. [Tropidocerca]. *Tetrameres*, p. 362.
- contortum* Creplin, 1839, t.h. *Charadrius hiaticula*, etc. [Trichosoma]. *Capillaria*, p. 25.
- contortum* Linstow, 1906, t.h. *Bufo vulg.* [Oxysoma]. *Aplectana*, p. 209.
- contortus* Molin, 1858, t.h. *Ibis falcinellus*. [Disph.]. *Echinuria*, p. 331.
- contortus* Rud., 1803, t.h. *Ovis aries*. [Str.]. *Hæmonchus*, p. 122.
- contortus* Rud., 1819, t.h. *Mus capensis*. [Trichoc.]. *Trichuris*, p. 23.

- \**convoluta* Zeder, 1803, t.h. Talpa. [Fus.]. Spirura, p. 294.  
*convolutum* Fourm., 1885, t.h. Ossifraga gigantea. [Calodium]. Capillaria, p. 25.  
*convolutus* Kuhn, 1829, t.h. Delphinus phocæna. [Str.]. Tornyurus, p. 171.  
*\*convolutus* Ostertag, 1890, t.h. Bos taurus. [Str.]. Ostertagia, p. 125.  
*cordata* Linstow, 1906, t.h. Callipepla squamata. [Het.]. Ascaridia, p. 268.  
*\*cornicis* Gmelin, 1790, t.h. Corvus cornix. [Fil.]. Diplotriana, p. 434.  
*cornuta* Linstow, 1899, t.h. antelope. [Fil.]. Setaria, p. 423.  
*cornuta* Stossich, 1904, t.h. Thynnus vulg. [Asc.]. Contracæcum, p. 282.  
*coronata* Beneden, 1858, t.h. Raja radians, Scillium canicula. [Spiroptera]. Proleptus, p. 358.  
*coronata* Molin, 1860, t.h. Alcedo americana, Rallus cayennensis. [Spiropt.]. Histiocephalus, p. 370.  
*coronata* Rud., 1809, t.h. Coracias garrula. [Fil.]. Coronofilaria, p. 411.  
*coronatum* Looss, 1900, t.h. Equus cab., etc. [Cyathost.]. Trichonema, p. 55.  
*coronatus* Molin, 1861, t.h. Mergus merganser. Hystrichis, p. 181.  
*coronatus* Molin, 1861, t.h. Phyllostoma discolor. Histiostrogylus, p. 133.  
*\*coronatus* Zeder, 1800, t.h. Muræna anguilla. [Cucullanus]. Camallanus, p. 378.  
*coronellæ* Ortlepp, 1923, t.h. Coronella triangulum. Kalicephalus, p. 114.  
*corvorum* Rud., 1819, t.h. Corvus caryocatactes, etc. [Trichosoma]. Capillaria, p. 25.  
*corynodes* Linstow, 1899, t.h. Cercocæbus fuliginosus, etc. [Fil.]. Dirofilaria, p. 393.  
*coscorobæ* Chapin, 1925, t.h. Coscoroba coscoroba. [Cyathost.]. Syngamus, p. 157.  
*costatus* Rud., 1819, t.h. Coluber sp. [Str.]. Kalicephalus, p. 114.  
*costellatus* Duj., 1845, t.h. Arvicola arvalis. [Str.]. Heligmosomum, p. 142.  
*cotylophora* Ward and Magath, 1916, t.h. Perca flavescens, Stizostedion vitreum. Dacnitoïdes, p. 384.  
*crassa* Deslongchamps, 1824, t.h. Anas bosches dom. [Asc.]. Porrocæcum, p. 279.  
*crassa* Linstow, 1879, t.h. Alauda arvensis. Physaloptera, p. 353.  
*crassa* Railliet and Henry, 1910, t.h. Otis tarda. Aprocta, p. 405.  
*crassicauda* Bellingham, 1840, t.h. Norway rat. [Trichosoma]. Trichosomoides, p. 32.  
*crassicauda* Creplin, 1829, t.h. Balæna rostrata. [Fil.]. Crassicauda, p. 437.  
*crassicauda* Creplin, 1829, t.h. Colymbus rufogularis, Anas glacialis. [Spiropt.]. Streptocara, p. 360.  
*\*crassicauda* (Creplin, 1829) of Leiper and Atkinson, 1914, t.h. Megaptera. Crassicauda, p. 437.  
*crassicauda* var. *charadrii* Skrjabin, 1916, t.h. Vanellus cristatus. Streptocara, p. 360.  
*crassispiculum* Sonsino, 1889, t.h. Megalotis cerdo. [Het.]. Oxynema, p. 230.  
*crassissimus* Molin, 1860, t.h. Rhamphastos vitellinus. [Disph.]. Acuaria, p. 328.  
*\*crenatum* Railliet, 1898, t.h. sheep. Gongylonema, p. 315.  
*\*crenatus* Rud., 1809, t.h. Sus scrofa dom. et fera. [Trichoc.]. Trichuris, p. 23.  
*crenulata* Bremser, 1824, t.h. Felis onça. [Asc.]. Toxocara, p. 258.  
*crinalis* Wedl, 1855, t.h. Lophius piscatorius. Dikentrocephalus, p. 387.  
*criniformis* Gæze, 1782, t.h. Ursus meles. [Asc.]. Uncinaria, p. 102.  
*cristata* Froelich, 1802, t.h. Mus sylvaticus. Rictularia, p. 345.  
*cristata* Linstow, 1901, t.h. Balearica regulorum. [Het.]. Ascaridia, p. 268.  
*cristatum* Geddoelst, 1917, t.h. Sciurus prevosti. Heligmosomum, p. 142.  
*cristatus* Railliet and Henry, 1915, t.h. Phycis tenuis. Spinitectus, p. 349.  
*cristatus* (Seurat, 1912) Railliet, 1915, t.h. dromedary. [Spiropt.]. Physocephalus, p. 308.  
*crocodili* Taylor, 1924, t.h. crocodile. Porrocæcum, p. 280.  
*croci* Seurat, 1914, t.h. Accipiter nisus. Physaloptera, p. 353.  
*crotali* Rud., 1819, t.h. Crotalus durissus. [Trichosoma]. Capillaria, p. 25.  
*cruzi* Travassos, 1914, t.h. Bucco swainsoni, Melanerpes flavifrons. Tetrameres, p. 362.  
*crypturi* Rud., 1819, t.h. Crypturus. [Trichosoma]. Capillaria, p. 25.



- cucullatum* Hall, 1916, t.h. *Eutamias amoenus operarius*. *Heteroxytnema*, p. 232.
- cucullus* Linstow, 1899, t.h. *Potamogale velox*. [*Ancyracanthus*]. *Galeiceps*, p. 444.
- cuniculi* Graybill, 1923, t.h. rabbit. [*Obeliscus*]. *Obeliscoides*, p. 130.
- curticei* Railliet, 1893, for *curticii* Giles, 1892. [*Str.*]. *Cooperia*, p. 132.
- \**curticii* Giles, 1892, t.h. *Ovis aries*. [*Str.*]. *Cooperia*, p. 132.
- curvata* Linstow, 1883, t.h. *Perdix græca*. [*Het.*]. *Subulura*, p. 227.
- curvicauda* Duj., 1845, t.h. *Hirundo rustica*. [*Trichosoma*]. *Capillaria*, p. 25.
- \**curvula* Rud., 1803, t.h. *Equus cab.* *Oxyuris*, p. 185.
- cyathopharynx* Baylis, 1923, t.h. *Heterobranchus anguillaris*. [*Camallanus*]. *Paramallanus*, p. 379.
- cylindracea* Ward and Magath, 1916, t.h. *Perca flavescens*. [*Ichthyonema*]. *Philometra*, p. 443.
- cylindrica* Blome, 1909, t.h. *Tetrao urogallus*. [*Het.*]. *Ascaridia*, p. 268.
- cylindrica* Linstow, 1883, t.h. *Petræa cyanea*. *Aprocta*, p. 405.
- cylindrica* Thapar, 1925, t.h. *Rhinoceros africanus*. *Kiluluma*, p. 71.
- cylindricum* Eberth, 1863, t.h. *Falco buteo*. [*Trichosoma*]. *Capillaria*, p. 25.
- \**cymatostomum* Kotlán, 1919, t.h. *Equines*. [*Cylicost.*]. *Trichonema*, p. 56.
- \**cystidicola* Lamarck, 1801, t.h. *Salmo fario*. [*Fissula*]. *Cystidicola*, p. 324.
- dacelonis* Breinl, 1913, t.h. *Dacelo leachii*. [*Fil.*]. *Thelazia*, p. 318.
- \**dacnodes* Creplin, 1851, t.h. *Raja clavata*. [*Spiropt.*]. *Proleptus*, p. 358.
- dactyluris* Rud., 1819, t.h. *Testudo græca*. [*Asc.*]. *Atractis*, p. 244.
- dahli* Linstow, 1898, t.h. *Macropus browni*. *Cloacina*, p. 176.
- dahomensis* Gendre, 1911, t.h. *Cricetomys gambianus*. *Heterakis*, p. 216.
- \**dahomensis* Neumann, 1895, t.h. *Python natalensis*. [*Fil.*]. *Dracunculus*, p. 442.
- dasypodina* Baylis, 1922, t.h. *Dasypus gymnurus*. *Ascaris*, p. 257.
- decipiens* Krabbe, 1878, t.h. *Cystophora cristata*, etc. [*Asc.*]. *Porrocaecum*, p. 280.
- decorata* Travassos, 1923, t.h. *Coendu brandti*. *Wellcomeia*, p. 197.
- decoratus* Creplin, 1847, t.h. *Canis vulpes*. [*Str.*]. *Crenosoma*, p. 166.
- decorus* Duj., 1845, t.h. *Alcedo ispida*. [*Disph.*]. *Seuratia*, p. 335, or *Streptocara*, p. 360.
- \**decrusi* Lane, 1914, t.h. *Elephas indicus*. *Decrusia*, p. 38.
- delicatus* Hall, 1916, t.h. *Sciurus aberti mimus*. *Trichostrongylus*, p. 119.
- delphini* Baylis and Daubney, 1925, t.h. *Delphinus delphis*. *Halocercus*, p. 171.
- delta* Travassos, 1918, t.h. *Muridæ*. *Heligmosomum*, p. 142.
- deminutus* Railliet and Henry, 1905, t.h. *Homo*. [*Triodontophorus*]. *Ternidens*, p. 89.
- dentata* Drasche, 1884, t.h. *Testudo græca*. [*Oxy.*]. *Tachygonetria*, p. 199.
- dentata* Linstow, 1883, t.h. *Agama sanguinolenta*, etc. *Physaloptera*, p. 353.
- dentata* Linstow, 1904, t.h. *Sus cristatus*. [*Spiropt.*]. *Arduenna*, p. 308.
- dentatus* Diesing, 1839, t.h. *Sus scrofa dom.* *Stephanurus*, p. 52.
- dentatus* Rud., 1803, t.h. *Sus scrofa*. [*Str.*]. *Œsophagostomum*, p. 87.
- denticulata* Molin, 1860, t.h. *Falco palumbarius*, *Merops apiaster*. [*Spiropt.*]. *Acuaria*, p. 328.
- \**denticulatus* Rud., 1819, t.h. *Muræna anguilla*. [*Lior.*]. *Spinitectus*, p. 349.
- dentigerum* Railliet and Henry, 1906, t.h. *Anthropopithecus troglodytes*. *Œsophagostomum*, p. 87.
- denudatus* Duj., 1845, t.h. *Cyprinus erythrophthalmus*. [*Disph.*]. *Rhabdochona*, p. 324.
- denudatus* Rud., 1819, t.h. *Coluber tessellatus*. [*Str.*]. *Oswaldocruzia*, p. 127.
- depressa* Baylis, 1920, t.h. *Mungos fasciatus* (true host birds). *Thelazia*, p. 318.
- depressa* Schneider, 1866, t.h. *Corvus cornix*. [*Fil.*]. *Acuaria*, p. 328.
- depressa* Zeder, 1800, t.h. *Falco albicilla*. [*Fus.*]. *Porrocaecum*, p. 281.
- \**depressiusculus* Rud., 1809, t.h. *Vulpes*. [*Trichoc.*]. *Trichuris*, p. 23.
- depressus* Duj., 1845, t.h. *Sorex tetragonurus*. [*Str.*]. *Viannaia*, p. 149.

- diacantha* Molin, 1858, t.h. *Hystrix prehensilis*, etc. [Fil.]. *Dipetalonema*, p. 427.
- diadema* Baylis, 1916, t.h. *Helicops angulatus*. Tanqua, p. 342.
- didelphis* Travassos, 1914, t.h. *Didelphys aurita*. [Nematodirus]. *Heligmosomum*, p. 142.
- didieri* Neveu-Lemaire, 1924, t.h. African rhinoceros. [Henryella]. Murshidia, p. 79.
- diducta* Railliet, Henry, and Bauche, 1919, t.h. pig. Bourgelatia, p. 82.
- diesingii* Molin, 1858, t.h. *Larus capistranus*. *Cosmocephalus*, p. 337.
- differens* Sonsino, 1890, t.h. *Gallus dom.* [Het.]. *Subulura*, p. 227.
- digitata* Linstow, 1906, t.h. *Bos indicus*. [Fil.]. *Setaria*, p. 423.
- digitata* Schneider, 1866, t.h. *Felis concolor*. *Physaloptera*, p. 353.
- digitata* Travassos, 1918, t.h. *Rhamphastus* sp. *Thelazia*, p. 318.
- digitatus* Linstow, 1906, t.h. *Bos indicus*. [Str.]. *Mecistocirrus*, p. 139.
- dilatata* Rud., 1819, t.h. *Simia rosalia*. *Physaloptera*, p. 353.
- \**dilatatus* Railliet, 1884, t.h. cattle. [Str.]. *Oesophagostomum*, p. 87.
- dimidiatus* Diesing, 1851, t.h. *Rhea americana*. *Deletrocephalus*, p. 173.
- diomedæ* Linstow, 1888, t.h. *Diomedea brachyura*. [Asc.]. *Anisakis*, p. 272.
- discolor* Linstow, 1906, t.h. *Bos indicus*. [Trichoc.]. *Trichuris*, p. 23.
- dispar* Diesing, 1851, t.h. *Felis concolor*. [Sclerost.]. *Syngamus*, p. 157.
- dispar* Duj., 1845, t.h. *Anguis fragilis*. [Str.]. *Oswaldoocruzia*, p. 127.
- dispar* Duj., 1845, t.h. *Falco subbuteo*. [Trichosoma]. *Capillaria*, p. 25.
- dispar* Linstow, 1904, t.h. *Erinaceus albiventris*. *Physaloptera*, p. 353.
- \**dispar* Rud., 1802, t.h. *Homo*. [Trichoc.]. *Trichuris*, p. 22.
- dispar* Schrank, 1790, t.h. *Anser dom.* [Asc.]. *Heterakis*, p. 216.
- disparalis* Irwin-Smith, 1922, t.h. *Hinulia* sp. *Rictularia*, p. 345.
- distans* Rud., 1809, t.h. *Simia sabæa*. [Asc.]. *Subulura*, p. 227.
- diucæ* Boulenger, 1920, t.h. *Diuca grisea*. *Diplotriana*, p. 434.
- dodsworthi* Barreto, 1922, t.h. *Spheroides testudineus*. *Cucullanus*, p. 383.
- dogieli* Skrjabin, 1916, in *Bufo* sp. [Oxysomatium]. *Aplectana*, p. 209.
- dolichocerca* Stoss., 1902, t.h. *Circus spilothonax*. [Het.]. *Ascaridia*, p. 268.
- \**douglasi* Geddoelst, 1911, for *douglassii* Cobbold, 1882. [Str.]. *Libyostongylus*, p. 120.
- douglassii* Cobbold, 1882, t.h. *Struthio camelus*. [Str.]. *Libyostongylus*, p. 120.
- dracunculoides* Cobbold, 1870, t.h. *Proteles cristatus*. [Acanthocheilonema]. *Dipetalonema*, p. 427.
- \**draschei* Stossich, 1898, t.h. *Testudo græca*. [Oxy.]. *Mehdiella*, p. 201.
- dromedarii* May, 1920, t.h. dromedary. *Nematodirus*, p. 136.
- droumondi* Travassos, 1915, t.h. *Cygnus melanocoryphus*. *Capillaria*, p. 25.
- dubia* Travassos, 1917, t.h. *Atilla cinerea*. *Capillaria*, p. 25.
- dubia* Travassos, 1917, t.h. *Gallinago paraguayæ*. *Tetrameres*, p. 362.
- duboisii* Geddoelst, 1916, t.h. toad. [Fil.]. *Foleyella*, p. 395.
- dujardini* Maupas, in Seurat, 1916, t.h. *Anguis fragilis*. [Angiost.]. *Rhabdias*, p. 18.
- \**dujardini* Travassos, 1914, t.h. *Columba livia dom.*, etc. *Capillaria*, p. 25.
- \**dujardini* Travassos, 1920, t.h. *Crocodylus* spp. *Dujardinia*, p. 277.
- duodenale* Dubini, 1843, t.h. *Homo*. [Agchylostoma]. *Ancylostoma*, p. 92.
- dumerilii* Perrier, 1871, t.h. *Emys picta*. [Cucullanus]. *Camallanus*, p. 378.
- dussemerii* Beneden, 1870, t.h. *Delphinus* sp. [Asc.]. *Anisakis*, p. 272.
- \**ecaudata* Oerley, 1882, t.h. *Lamprotornis æneus*. [Fil.]. *Diplotriana*, p. 434.
- echinata* Linstow, 1878, t.h. *Alburnus lucidus*. [Fil.]. *Spinitectus*, p. 349.
- echinata* Rud., 1819, t.h. *Lacerta* (Gecko) *stellio*. [Asc.]. *Thelandros*, p. 193.
- echinatus* Rud., 1809, t.h. *Lacerta apus*. [Trichoc.]. *Sclerotrichum*, p. 30.
- \**echinophallus* Nitzsch, 1849, t.h. *Camelus dromedarius*. [Trichoc.]. *Trichuris*, p. 23.
- \**echinopharynx* Thapar, 1925, t.h. *Testudo tabulata*. [Echinopharynx]. *Sauricola*, p. 62.

- echiurus* Diesing, 1853, t.h. *Tenebrio molitor*. *Mastophorus*, p. 387.  
*edentatum* Looss, 1900, t.h. *Equus* cab. [*Sclerost.*]. *Strongylus*, p. 37.  
*effilata* Linstow, 1897, t.h. *Tragulus pygmæus*. [*Fil.*]. *Setaria*, p. 423.  
*elegans* Gendre, 1909, t.h. *Chamaleon gracilis*. [*Het.*]. *Strongyluris*, p. 223.  
*elegans* Oerley, 1885, t.h. *Hexanchus griseus*. [*Spiroptera*]. *Proleptus*, p. 358.  
*elegans* Offers, 1816, t.h. *Merganser merganser*. [*Str.*]. *Eustrongylides*, p. 179.  
\**elegans* Offers of Railliet, 1895, in part. [*Str.*]. *Eustrongylides*, p. 179.  
*elegans* Travassos, 1921, t.h. *Condu villosus*. *Heligmosomum*, p. 142.  
\**elegans* Zeder, 1800, t.h. *Lucioperca*. [*Cucullanus*]. *Camallanus*, p. 378.  
*elegantissima* Stossich, 1902, t.h. *Ratelus capensis*. *Physaloptera*, p. 353.  
*ellipticus* Molin, 1858, t.h. *Falco nisus*. [*Disph.*]. *Acuaria*, p. 328.  
*elongata* Rud., 1819, t.h. *Sterna nigra*. [*Spiropt.*]. *Rusguniella*, p. 333.  
*elongata* Seurat, 1914, t.h. *Dipodilla campestris*. *Allodapa*, p. 229.  
*elongatum* Looss, 1900, t.h. *Equus*. [*Cyathost.*]. *Trichonema*, p. 56.  
*elongatum* var. *kolláni* Ihle, 1920, t.h. *Equus*. [*Cylicost.*]. *Trichonema*, p. 56.  
\**elongatum* var. *macrobursata* Kotlán, 1920, t.h. *Equus*. [*Cylicost.*]. *Trichonema*, p. 56.  
*elongatus* Duj., 1845, t.h. *Sus scrofa*. [*Str.*]. *Metastrongylus*, p. 160.  
*elvire* Parona, 1889, t.h. *Sciurus rufigenis*. *Rictularia*, p. 345.  
*encapsulatum* Schwartz, 1925, t.h. *Blarina brevicauda*. *Porrocaecum*, p. 281.  
*enyonium* Baylis and Daubney, 1922, t.h. *Ciconia nigra*. *Contracaecum*, p. 282.  
*ensicaudata* Zeder, 1800, t.h. *Turdus merula*. [*Fus.*]. *Porrocaecum*, p. 281.  
*entomelas* Duj., 1845, t.h. *Anguis fragilis*. [*Angiost.*]. *Rhabdias*, p. 18.  
*entomelas* Duj., 1845, t.h. *Mustela foina*. [*Trichosoma*]. *Capillaria*, p. 25.  
*epistomum* Piana and Stazzi, 1900, t.h. *Elephas*. [*Sclerost.*]. *Choniangium*, p. 41.  
*equi* Schrank, 1788, t.h. *Equus* cab. [*Trichoc.*]. *Oxyuris*, p. 185.  
\**equi* Schrank, 1788, t.h. *Equus* cab. [*Asc.*]. *Parascaris*, p. 262.  
*equi* Yorke and Macfie, 1918, t.h. *Equines*. *Gyalocephalus*, p. 62.  
*equinus* Abildgaard, 1789, t.h. *Equus* cab. [*Gordius*]. *Setaria*, p. 423.  
*equinus* Mueller, 1780, t.h. *Equus* cab. *Strongylus*, p. 37.  
*equorum* Goeze, 1782, t.h. *Equus* cab. [*Asc.*]. *Parascaris*, p. 262.  
*eremita* Leidy, 1886, t.h. *Meles labradorica*. *Monopetalonema*, p. 438.  
*erinacei* Rud., 1819, t.h. *Erinaceus europæus*. [*Trichosoma*]. *Capillaria*, p. 25.  
*ersiliae* Stossich, 1896, t.h. *Python molurus*. [*Str.*]. *Kalicephalus*, p. 114.  
\**esuriens* Duj., 1845, t.h. *Pleuronectes latus*, *P. soleæ*. [*Dacnitis*]. *Cucullanus*, p. 381.  
*ethiopica* Khalil, 1922, t.h. African elephant. *Quilonia*, p. 73.  
*euproctum* Boulenger, 1917, t.h. *Equus* cab. [*Cylichnost.*]. *Trichonema*, p. 56.  
*eurycephalum* Goodey, 1924, t.h. roan antelope. *Oesophagostomum*, p. 87.  
*eurycerca* Seurat, 1914, t.h. *Perdix rouge*. *Cyrnea*, p. 300.  
*euryoptera* Rud., 1819, t.h. *Lanius collurio*, etc. [*Spiropt.*]. *Viguiera*, p. 371.  
*evansi* Lewis, 1882, t.h. camel. [*Fil.*]. *Dipetalonema*, p. 427.  
*evoluta* Linstow, 1899, t.h. *Hystrix brachyura*. [*Oxv.*]. *Wellcomeia*, p. 197.  
*excisa* Molin, 1860, t.h. *Ciconia maguari*. [*Spiropt.*]. *Cyrnea*, p. 300.  
*excisus* Jaegerskiöld, 1909, t.h. *Phalacrocorax carbo*, *P. pygmæus*. *Eustrongylides*, p. 180.  
*exiguum* Duj., 1845, t.h. *Erinaceus europæus*. [*Trichosoma*]. *Capillaria*, p. 25.  
*exile* Duj., 1845, t.h. *Turdus merula*. [*Trichosoma*]. *Capillaria*, p. 25.  
*exilidens* Looss, 1912, t.h. *Anthropopithecus troglodytes*. *Necator*, p. 99.  
\**exilis* Duj., 1845, t.h. *Sorex tetragonurus*. [*Liniscus*]. *Capillaria*, p. 26.  
*extenuata* Rud., 1819, t.h. *Lacerta margaritacea*. [*Asc.*]. *Pharyngodon*, p. 194.  
*extenuatus* Railliet, 1898, t.h. *Ovis aries*. [*Str.*]. *Trichostrongylus*, p. 119.  
*fabri* Rud., 1819, t.h. *Zeus faber*. [*Asc.*]. *Contracaecum*, p. 282.  
*falcatum* Linstow, 1906, t.h. *Nicoria trijuga*. [*Oxysoma*]. *Spironoura*, p. 239.  
*falcifer* Cobbold, 1882, t.h. *Elephas indicus*. [*Str.*]. *Murshidia*, p. 79.

- falcigera* Railliet and Henry, 1907, t.h. *Leptonychotes weddelli*, *Omnatophoca rossi*. [Asc.]. *Contracæcum*, p. 282.
- falconis* Connal, 1912, t.h. *Falco* sp. [*Triplotriæna*]. *Diplotriæna*, p. 434.
- falconum* Rud., 1819, t.h. *Falco buteo*, *F. milvus*. [*Trichosoma*]. *Capillaria*, p. 26.
- fulcalatus* Ransom, 1911, t.h. *Capra hircus*. *Trichostrongylus*, p. 119.
- fallax* Jaegerskiöld, 1909, t.h. *Sciurus melanogaster*. *Rictularia*, p. 345.
- fariai* Travassos, 1913, t.h. *Odontophorus capueira*. *Heterakis*, p. 216.
- fariai* Travassos, 1914, t.h. *Leptoptila rufaxila*. *Ornithostrongylus*, p. 128.
- fariai* Travassos, 1915, t.h. *Lepus brasiliensis*. [*Viannaia*]. *Viannella*, p. 150.
- farionis* Fischer, 1798, t.h. trout. *Cystidicola*, p. 324.
- fasciata* Baylis, 1920, t.h. *Vinago delalandii*. *Ascaridia*, p. 268.
- fasciata* Railliet and Henry, 1910, t.h. dromedary. *Onchocerca*, p. 414.
- fasciata* Schneider, 1866, t.h. *Dasypus novemcinctus*. [Het.]. *Aspidodera*, p. 229.
- fasciolata* Gendre, 1909, t.h. *Cinixys belliana*. *Atractis*, p. 244.
- \**felineum* Hegt, 1910, t.h. *Felis dom.* *Chlamydonema*, p. 356.
- felineus* Cameron, 1923, t.h. *Felis yaguarundi*. *Molineus*, p. 126.
- feliscati* Bellingham, 1844, t.h. *Felis catus ferus*. [*Trichosomum*]. *Capillaria*, p. 26.
- \**ferox* Hemprich and Ehrenberg, 1828, t.h. *Hyrax syriacus*. [Asc.]. *Crossophorus*, p. 287.
- fiberius* Barker and Noyes, 1915, t.h. *Fiber zibethicus*. *Trichostrongylus*, p. 119.
- ficheuri* Seurat, 1916, t.h. *Bubulcus lucidus*. *Habronema*, p. 297.
- filaria* Beneden, 1873, t.h. *Vespertilio auritus*. [*Litosoma*]. *Litomosia*, p. 399.
- filaria* Duj., 1845, t.h. a snake, probably python. [Asc.]. *Ophidascaris*, p. 263.
- filaria* Rud., 1809, t.h. *Ovis aries*. [Str.]. *Dictyocaulus*, p. 162.
- filicollis* Rud., 1802, t.h. *Ovis aries*. [Asc.]. *Nematodirus*, p. 135.
- filiforme* Linstow, 1885, t.h. *Triton alpestris*, *T. cristatus*. [*Trichosoma*]. *Capillaria*, p. 26.
- \**filiforme* Molin, 1857, t.h. *Simia inuus*. [*Gongylonema*]. *Dipetalonema*, p. 425.
- filiformis* (Goeze, 1782) Travassos, 1917, t.h. *Rana temporaria*, etc. [Asc.]. *Oswaldocruzia*, p. 127.
- filiformis* Molin, 1858, t.h. *Anabates rufifrons*. [Fil.]. *Diplotriæna*, p. 434.
- filiformis* Stossich, 1896, t.h. *Pagellus erythrinus*, *Trachinus draco*. [*Ichthyonema*]. *Philometra*, p. 443.
- filiformis* Stossich, 1904, t.h. *Uranoscopus scaber*. [Asc.]. *Contracæcum*, p. 282.
- \**filiformis* Zschokke, 1884, t.h. *Alburnus lucidus*. [Dispharagus]. *Rhabdochona*, p. 324.
- \**filum* Duj., 1845, t.h. *Delphinus phocæna*. *Pseudalius*, p. 168.
- fimbriatus* Ortlepp, 1923, t.h. *Bungarus fasciatus*. *Occipitodontus*, p. 115.
- fissispina* Diesing, 1861, t.h. *Anas boschas dom.*, etc. [*Tropidocerca*]. *Tetrameres*, p. 362.
- flabellata* Linstow, 1888, t.h. *Paradisea apoda*. [Fil.]. *Diplotriæna*, p. 434.
- flagellum* Hemprich and Ehrenberg, 1828, t.h. *Hyrax capensis*. [Oxy.]. *Hoplodontophorus*, p. 234.
- flexuosa* Schneider, 1866, t.h. *Crotalus*. [Het.]. *Ascaridia*, p. 268.
- flexuosa* Wedl, 1856, t.h. *Cervus elaphus*. [Fil.]. *Onchocerca*, p. 414.
- fecunda* Rud., 1819, t.h. *Rana cornuta*, *Hyla* sp. [Asc.]. *Aplectana*, p. 209.
- foliatus* Cobbold, 1882, t.h. *Elephas indicus*. [Str.]. *Bunostomum*, p. 109.
- forcipata* Rud., 1819, t.h. *Cuculus nævius*. [Asc.]. *Subulura*, p. 228.
- \**fordi* (Daniels) Neveu-Lemaire, 1914, for *fordini* Daniels, 1908. *Mecistocirrus*, p. 139.
- \**fordini* Daniels, 1908, t.h. Indian buffalo. [Str.]. *Mecistocirrus*, p. 139.
- formosana* Yokogawa, 1922, t.h. *Sorex* sp. *Physaloptera*, p. 353.
- fossor* Hall, 1916, t.h. *Thomomys fossor*. *Trichuris*, p. 23.
- fossor* Jaegerskiöld, 1902, t.h. *Lates niloticus*. [*Dichelyne*]. *Cucullanus*, p. 383.
- \**foveolata* Molin, 1858, t.h. *Corvus frugilegus*, etc. [Fil.]. *Serratospiculum*, p. 428.
- \**foveolatus* Rud., 1809, t.h. *Gadus*. *Cucullanus*, p. 381.

- francolina* Linstow, 1899, t.h. *Francolinus bicalcaratus*. [Het.]. Ascaridia, p. 268.
- fringillæ* Rud., 1819, t.h. *Fringilla œlebs*. [Trichosoma]. Capillaria, p. 26.
- frutachi* Travassos, 1914, t.h. *Malapterurus electricus*. Capillaria, p. 26.
- fulicæ* Rud., 1819, t.h. *Fulica atra*. [Spiropt.]. Amidostomum, p. 154.
- fulleborni* Linstow, 1905, t.h. *Anthropopithecus troglodytes*. Strongyloides, p. 20.
- furcatus* May, 1920, t.h. sheep. Nematodirus, p. 136.
- fusca* Rud., 1819, t.h. *Pleuronectes mancus*. [Fil.]. Philometra, p. 443.
- fuscovenosum* Railliet, 1899, t.h. *Tropidonotus natrix*. [Angiost.]. Rhabdias, p. 18.
- fusiformis* Linstow, 1902, t.h. *Micropogon* sp. Physaloptera, p. 353.
- fusiformis* Molin, 1860, t.h. *Platessa flesus*. [Dacnitis]. Cucullanus, p. 383.
- \**gadus* Beneden, 1858, t.h. *Gadus morrhua*. [Dacnitis]. Cucullanus, p. 381.
- galeatus* Rud., 1819, t.h. *Lacerta teguixin*. [Str.]. Diaphanocephalus, p. 113.
- galebi* Khalil, 1922, t.h. Indian elephant. Leiperenia, p. 247.
- galinieri* Seurat, 1914, t.h. eagle. Physaloptera, p. 353.
- galloperdicis* Baylis and Daubney, 1922, t.h. *Galloperdix spadicea*. Subulura, p. 228.
- gambiana* Gendre, 1922, t.h. a fish. Rhabdochona, p. 325.
- gambiensis* Ortlepp, 1925, t.h. African mongoose. Arthrocephalus, p. 107.
- gamma* Travassos, 1918, t.h. *Mesomys guira*. Heligmosomum, p. 142.
- gangetica* Baylis and Lane, 1920, t.h. *Trionyx gangeticus*. Spiroxys, p. 304.
- \**gangula* Lane, 1914, t.h. *Mus decumanus*. [Ganguleterakis]. Heterakis, p. 216, or Ganguleterakis, p. 218.
- \**gastrophila* Mueller, 1894, t.h. *Felis dom.* [Fil.]. Spirura, p. 294.
- \**gastrophila* Seurat, 1913, not Mueller, 1894, t.h. *Elephantulus deserti*. Spirura, p. 294.
- gedoelsti* nom. nov., t.h. large toad. Amplicæcum, p. 279.
- gemina* Linstow, 1899, t.h. *Felis catus dom.* Physaloptera, p. 353.
- gestri* Parona, 1890, t.h. *Tropidonotus quincunciatus*. [Asc.]. Ophidascaris, p. 263.
- getula* Seurat, 1915, t.h. *Xerus getulus*. Dermatoxys, p. 190.
- getula* Seurat, 1917, t.h. *Mus rattus*. Physaloptera, p. 354.
- \**gibbosus* Rud., 1819, t.h. *Scomber thynnus*. [Trichoc.]. Oncophora, p. 31.
- gibsoni* Cleland and Johnston, 1910, t.h. *Bos taurus*. Onchocerca, p. 414.
- \**gibsoni* Stephens, 1909, t.h. *Homo*. [Str.]. Mecistocirrus, p. 139.
- \**gigas* Rud., 1802, t.h. *Phoca vitulina*. [Str.]. Dioctophyme, p. 178.
- gigas* Spaul, 1923, t.h. *Agama distanti*. Strongyluris, p. 223.
- gigas* Travassos, 1917, t.h. *Anas boschas*. Tetrameres, p. 363.
- gilsoni* Gedoelst, 1917, t.h. *Sciurus prevosti*. Ancylostoma, p. 93.
- giraffæ* Diesing, 1851, t.h. *Camelopardalis giraffa*. [Trichoc.]. Trichuris, p. 23.
- giraffæ* n. sp., t.h. giraffe. Monodontella, p. 111.
- girardi* Lane, 1917, t.h. *Hystrix bengalensis*. [Gireterakis]. Heterakis, p. 216, or Gireterakis, p. 219.
- globicephalæ* Baylis and Daubney, 1925, t.h. *Globicephala melæna*. Stenurus, p. 170.
- globiceps* Rud., 1819, t.h. *Blennius phycis*, *Uranoscopus scaber*. [Fil.]. Philometra, p. 443.
- globocaudatus* Diesing, 1853, t.h. *Geotrupes stercorarius*. Mastophorus, p. 387.
- globosa* Linstow, 1879, t.h. *Fulica atra*. [Tropidocerca]. Tetrameres, p. 363.
- globosa* Zeder, 1800, t.h. *Salmo trutta*. [Cucullanus]. Bulbodaenitis, p. 383.
- globulosus* Linstow, 1901, t.h. *Camelus dromedarius*. [Trichoc.]. Trichuris, p. 23.
- glycirrhiza* Beneden, 1873, t.h. *Rhinolophus ferrum-equinum*. Strongylacantha, p. 96.
- goldi* Boulenger, 1917, t.h. *Equus cab.* [Cylichnost.]. Trichonema, p. 56.
- goodeyi* Thapar, 1925, t.h. *Rhinoceros africanus*. Kiluluma, p. 71.
- gordiodies* Beneden, 1858, t.h. *Galeus canis*. Proleptus, p. 358.
- gouldi* n. sp., t.h. *Varanus gouldi*. Hastospiculum, p. 432.
- gracile* Leidy, 1856, t.h. *Emys serrata*. Spironoura, p. 239.
- gracile* Linstow, 1899, t.h. *Francolinus* sp. [Oxysoma]. Subulura, p. 228.

- gracilis* Bellingham, 1840, t.h. *Gadus merluccius*. [Trichosoma]. Capillaria, p. 26.  
*gracilis* Chapin, 1925, t.h. *Corvus brachyrhynchos*. Syngamus, p. 157.  
*gracilis* Cram, 1924, t.h. cat. Protospirura, p. 305.  
*gracilis* Diesing, 1839, t.h. *Sudis gigas*. [Cheiracanthus]. Gnathostoma, p. 340.  
*gracilis* Gendre, 1912, t.h. *Buchanga atra assimilis*, *Oriolus auratus*. [Disph.].  
 Acuaría, p. 329.  
*gracilis* Leuckart, 1842, t.h. *Myoxus glis*. [Str.]. Heligmosomum, p. 142.  
 \**gracilis* McFadyean, 1896, not Leuck., 1842, t.h. *Bos taurus*. [Str.]. Trichostrongylus, p. 119.  
*gracilis* Ortlepp, 1922, t.h. lizard. Physaloptera, p. 354.  
*gracilis* Rud., 1809, t.h. *Simia capucina*. [Fil.]. Dipetalonema, p. 425.  
*gracilis* Rud., 1819, t.h. *Cavia aguti*. [Trichoc.]. Trichuris, p. 23.  
*gracilis* Rud., 1819, t.h. *Bradypus tridactylus*. [Spiropt.]. Physocephalus, p. 308.  
 \**gracilis* Stossich, 1906, t.h. larva in *Margaritifera* vulg. Echinocephalus, p. 343.  
*gracilis* Ward and Magath, 1916, t.h. black crappie, etc. Spinitectus, p. 349.  
*granulosa* Linstow, 1906, t.h. *Felis pardus*. [Fil.]. Dirofilaria, p. 394.  
*granulosa* Linstow, 1906, t.h. *Gallus gallinaceus*. [Het.]. Ascaridia, p. 268.  
*grassii* G. Noë, 1907, t.h. *Canis fam.* [Fil.]. Dipetalonema, p. 427.  
*grayi* Gemmill and Linstow, 1902, t.h. *Echinus escul.* [Ichthyonema]. Philometra, p. 443.  
*grimaldix* Seurat, 1915, t.h. *Vulpes atlantica*. Habronema, p. 297.  
*gruveli* Gendre, 1913, t.h. *Francolinus bicalcaratus*. [Disph.]. Acuaría, p. 329.  
*guianensis* Ortlepp, 1924, t.h. "Monki-monki." Protospirura, p. 305.  
*guiarti* Garin, 1913, t.h. *Leptonychotes weddelli*. Physaloptera, p. 354.  
*gulosa* Railliet and Henry, 1910, t.h. cattle. Thelazia, p. 318.  
*gulosa* Rud., 1819, t.h. *Testudo tabulata*. [Asc.]. Labiduris, p. 247.  
*guttata* Schneider, 1866, t.h. *Falco borigera*. [Fil.]. Serratospiculum, p. 428.  
*guthurosa* Neumann, 1910, t.h. *Bos taurus*. Onchocerca, p. 414.  
*gymnurus* Railliet, 1899, t.h. *Phoca vitulina*. [Pseudalius]. Halocercus, p. 171.  
*gynæcophila* Molin, 1858, t.h. *Ardea nycticorax*. [Tropidocerca]. Tetrameres, p. 363.  
  
*haberi* Steiner, 1924, t.h. *Hyla carolinensis*. Cosmocercella, p. 208.  
*hadii* Khalil, 1922, t.h. African elephant. Murshidia, p. 79.  
*hadweni* Chapin, 1925, t.h. *Bison bison*. Dictyocaulus, p. 162.  
*hæmochrous* Creplin, 1846, t.h. *Falco peregrinus*. Tetrameres, p. 363.  
 \**hæmorrhagica* Railliet, 1885, t.h. *Equus cab.* [Fil.]. Parafilaria, p. 392.  
*haliaëti* Baylis and Daubney, 1923, t.h. *Haliaëtus leucogaster*. Contracæcum, p. 282.  
*halicoris* Owen, 1833, t.h. *Halicore dugong*. [Asc.]. Dujardinia, p. 277.  
*halli* Barreto, 1917, t.h. *Tetrax tetrax*. Subulura, p. 228.  
*hamata* Daubney, 1923, t.h. *Phacochærus æthiopicus*. Murshidia, p. 79.  
*hamata* Linstow, 1877, t.h. *Falco nisus*. [Fil.]. Acuaría, p. 329.  
*hamata* Travassos, 1914, t.h. *Didelphis aurita*. Viannaia, p. 150.  
 \**hamia* Lane, 1914, t.h. domestic fowl. Ascaridia, p. 268.  
*hamulosa* Diesing, 1851, t.h. *Phasianus gallus*. [Spiropt.]. Acuria, p. 329.  
*hamulus* Linstow, 1906, t.h. *Pavo spicifer*. Heterakis, p. 216.  
*hargilæ* Baylis and Daubney, 1923, t.h. adjutant-stork. Echinuria, p. 331.  
 \**harkeri* Stödter, 1901, in part, t.h. *Bos taurus*. [Str.]. Ostertagia, p. 125.  
*hastatus* Linstow, 1905, t.h. *Tetrao tetrax*. [Str.]. Ornithostrongylus, p. 128.  
*hebreñicus* Lane, 1923, t.h. gorilla. Libyostrongylus, p. 120.  
*helicina* Molin, 1860, t.h. *Alcedo americana*, etc. [Spiropt.]. Pelecitus, p. 411.  
*helicina* Molin, 1860, t.h. *Crocodilus acutus*. [Asc.]. Dujardinia, p. 276.  
 \**helicina* (Molin, 1860) of Skrjabin, 1916, t.h. *Crocodilus acutus*. Trispiculascaris, p. 264.  
*helvetianus* May, 1920, t.h. cattle. Nematodirus, p. 136.  
*henryi* Skrjabin, 1915, t.h. *Vanellus cristatus*. Amidostomum, p. 154.

- hepaticus* Bancroft, 1893, t.h. common rat. [Trichoc.]. *Hepaticola*, p. 28.
- hermaphrodita* Frölich, 1789, t.h. *Psittacus æstivus*. [Asc.]. *Ascaridia*, p. 266.
- heteroclita* Molin, 1860, t.h. *Crax uru-mutum*. [Spiropt.]. *Oxyspirura*, p. 320.
- \**heterolobus* Diesing, 1838, t.h. *Manatus australis*. [Loboc.]. *Heterocheilus*, p. 270.
- heteroura* Creplin, 1829, t.h. *Charadrius pluvialis*. [Asc.]. *Porrocaecum*, p. 281.
- hexametra* Geddoelst, 1916, t.h. *Chamaeleon dilepis*. [Asc.]. *Polydelphis*, p. 266.
- hezauterina* Skrjabin, 1916, t.h. *Bothrops* sp. *Polydelphis*, p. 266.
- hians* Duj., 1845, t.h. *Muraena conger*. [Dacnitis]. *Cucullanus*, p. 383.
- hilgerti* Seurat, 1914, t.h. *Ctenodactylus gundi*. [Oxy.]. *Wellcomeia*, p. 197.
- hindlei* Thapar, 1925, t.h. *Tiligua senicordis*. *Pharyngodon*, p. 194.
- hippopotami* Geddoelst, 1924, t.h. *hippopotamus*. *Syngamus*, p. 157.
- hipsirhinæ* Chatin, 1876, t.h. *Hipsirhina bocourti*. *Hedruris*, p. 376.
- hirundinis* Rud., 1819, t.h. *Hirundo rustica*. [Trichosoma]. *Capillaria*, p. 26.
- hispidum* Fedtsch., 1872, t.h. *Bos taurus*. *Gnathostoma*, p. 340.
- holoptera* Rud., 1819, t.h. *Testudo mydas*. [Asc.]. *Angusticaecum*, p. 279.
- \**hominis* Schrank, 1788, t.h. *Homo*. [Trichoc.]. *Trichuris*, p. 22.
- hominis* Stiles, 1921, t.h. *Homo*. *Gongylonema*, p. 314.
- hopkeni* Leiper, 1910, t.h. *hippopotamus*. *Nematodirus*, p. 136.
- hornbyi* Boulenger, 1921, t.h. *Hippotragus niger*. *Setaria*, p. 423.
- \**horrida* Diesing, 1851, t.h. *Rhea americana*. [Fil.]. *Contortospiculum*, p. 430.
- horridus* Leidy, 1856, t.h. *Alligator mississippiensis*. [Cheiracanthus]. *Gnathostoma*, p. 340.
- hyalina* Seurat, 1917, t.h. *Tarentola mauritanica*. *Thamugadia*, p. 407.
- hybridum* Kotlán, 1920, t.h. *Equines*. [Cylicost.]. *Trichonema*, p. 56.
- hydrocheri* Travassos, 1914, t.h. *Hydrochoerus capibara*. [Viannaia]. *Viannella*, p. 150.
- hydrocheri* Travassos, 1916, t.h. *Hydrochoerus capibara*. *Capillaria*, p. 26.
- \**hypostomum* (Rud., 1819) Duj., 1845, t.h. *Antilope rupicapra*, *Cervus capreolus*, *Ovis aries*. [Sclerost.]. *Bunostomum*, p. 109.
- \**hypostomus* Rud., 1819, t.h. *Antilope rupicapra*. [Str.]. *Chabertia*, p. 89.
- hystrix* Diesing, 1851, t.h. *Podocnemis erythroce*. [Asc.]. *Atractis*, p. 245.
- icosiensis* Seurat, 1917, t.h. *Gingylus ocellatus*. [Strongyluris]. *Spinicauda*, p. 225.
- ignotus* Jaegerskiöld, 1909, t.h. *Ardea cocoi*, etc. *Eustrongylides*, p. 180.
- iguanae* Thapar, 1925, t.h. *Iguana tuberculata*. *Alaëuris*, p. 203.
- iheringi* Travassos, 1918, t.h. *Dasyprocta* sp. *Thelazia*, p. 318.
- \**ihlei* Kotlán, 1921, t.h. *Equines*. [Cylicost.]. *Trichonema*, p. 56.
- immitis* Leidy, 1856, t.h. *Canis fam.* [Fil.]. *Dirofilaria*, p. 393.
- immutatum* Ward and Magath, 1916, t.h. *Amia calva*. *Haplonema*, p. 326.
- impar* Schneider, 1866, t.h. *Osmerus eperlanus*. [Ancyracanthus]. *Cystidicola*, p. 324.
- imparidentatum* Quiel, 1919, t.h. *Equines*. *Poteriostomum*, p. 61.
- incerta* Smith, 1908, t.h. *parrakeets*. [Spiropt.]. *Habronema*, p. 297.
- incrassatum* Diesing, 1851, t.h. *Sorex tetragonurus*. [Trichosoma]. *Capillaria*, p. 26.
- incurva* Linstow, 1908, t.h. *Erinaceus frontalis*. *Physaloptera*, p. 354.
- incurva* Rud., 1819, t.h. *Xiphias gladius*. [Asc.]. *Contracecum*, p. 282.
- indica* Chandler, 1924, t.h. *Cissa chinensis*. *Hamulofilaria*, p. 398.
- indica* Sweet, 1915, t.h. *Bos bubalis*, *B. indicus*. *Onchocerca*, p. 414.
- indica* Ware, 1924, t.h. *Indian elephant*. [Pteridopharynx]. *Murshidia*, p. 79.
- indicum* Baylis, 1921, t.h. *Elephas indicus*. *Parabronema*, p. 336.
- indicus* Ortlepp, 1923, t.h. *Zamenis mucosus*, *Tropidonotus piscator*. *Kalicephalus*, p. 114.
- indicus* Railliet and Henry, 1910, t.h. *Tapirus indicus*. *Brachycolonus*, p. 101.
- inermicauda* Baylis, 1923, t.h. *Tarentola annularis*. *Pharyngodon*, p. 194.

- inermis* Gedoelst, 1919, t.h. *Cranorrhinus corrugatus*. [Gilsonia]. Hadjelia, p. 302.  
*inermis* Linstow, 1879, t.h. *Astur nisus*. [Tropidocerca]. Tetrameres, p. 363.  
*inermis* Linstow, 1906, t.h. *Sciurus prevosti*. Physaloptera, p. 354.  
*inermis* Molin, 1861, t.h. *Bothrops jararaca*, etc. *Kaliocephalus*, p. 114.  
*inermis* Zeder, 1800, t.h. *Muræna anguilla*. [Gœzia]. Spinitectus, p. 349.  
*\*inflata* Drasche, 1884, not Linstow, 1883, t.h. *Testudo græca*. [Oxy.]. Mehdiella, p. 201.  
*inflata* Mehlis, 1846, t.h. *Charadrius pluvialis*, *Ciconia nigra*. [Spiropt.]. Tetramere, p. 363.  
*inflata* Molin, 1860, t.h. *Falco uncinatus*. [Spiropt.]. Physaloptera, p. 354.  
*\*inflatus* Schneider, 1866, t.h. *Bos taurus*. [Str.]. Esophagostomum, p. 87.  
*\*inflexa* Zeder, 1800, of Rud., 1819, t.h. *Anas boschas dom.*, etc. [Fus.]. Ascaridia, p. 268.  
*inflexocaudata* von Siebold, 1842, t.h. common dolphin. [Fil.]. *Halocercus*, p. 171.  
*inflexus* Rud., 1819, t.h. *Turdus cyaneus*. [Trichosoma]. Capillaria, p. 26.  
*\*inflexus* Duj., 1845, not Rud., 1809, t.h. *Delphinus phocæna*. *Stenurus*, p. 170.  
*inflexus* Rud., 1809, t.h. *Delphinus phocæna*. [Str.]. *Pseudalius*, p. 168.  
*\*infundibulicola* Linstow, 1903, t.h. *Python reticulatus*. [Asc.]. *Ophidascaris*, p. 263.  
*infundibulum* Linstow, 1906, t.h. *Hystrix cristata*. [Trichoc.]. *Trichuris*, p. 23.  
*ingluvicola* Ransom, 1904, t.h. *Gallus domesticus*. *Gongylonema*, p. 314.  
*insigne* Boulenger, 1917, t.h. *Equus cab.* [Cylichnost.]. *Trichonema*, p. 56.  
*insignis* Diesing, 1851, t.h. *Delphinus amazonicus*. [Peritrichelius]. *Anisakis*, p. 273.  
*\*insignis* Schneider, 1866, t.h. *Picus*. [Fil.]. *Hamatospiculum*, p. 396.  
*instabilis* Railliet, 1893, t.h. *Ovis aries*, etc. [Str.]. *Trichostrongylus*, p. 119.  
*interlabiata* Ortlepp, 1923, t.h. *Rhizothera longirostris*. *Heterakis*, p. 216.  
*intermedia* Theiler, 1923, t.h. zebra. *Cylindropharynx*, p. 64.  
*intermedius* Monning, 1924, t.h. *Varanus sp.* *Strongylus*, p. 37.  
*intermedius* Neveu-Lemaire, 1924, t.h. *Rhinoceros bicornis*. *Grammocephalus*, p. 104.  
*intermedius* Oerley, 1885, t.h. *Mustelus lævis*. *Acanthocheilus*, p. 288.  
*\*intermedius* Sweet, 1909, t.h. *Equus cab.* *Triodontophorus*, p. 45.  
*\*intestinalis* Bavay, 1877, t.h. *Homo*. [Anguillula]. *Strongyloides*, p. 20.  
*intorta* Gedoelst, 1916, t.h. *Bitis spp.* [Asc.]. *Ophidascaris*, p. 263.  
*invaginata* Linstow, 1901, t.h. according to Gendre, 1913, *Bubulcus lucidus*. [Disph.]. *Acuaria*, p. 329.  
*involuta* Gedoelst, 1916, t.h. *Chamaeleon dilepis*. [Asc.]. *Amplicæcum*, p. 279.  
*involuta* Linstow, 1879, t.h. *Strix flammea*. [Fil.]. *Acuaria*, p. 329.  
*\*irritans* Rivolta, 1884, t.h. *Equus cab.* [Dermofil.]. *Habronema*, p. 298.  
*isolonche* Linstow, 1906, t.h. *Thaumalea amherstiae*. *Heterakis*, p. 216.
- jacchi* Marcel, 1857, t.h. *Jacchus sp.* [Asc.]. *Subulura*, p. 228.  
*javensis* Vevers, 1922, t.h. *Tragulus stanleyanus*. *Setaria*, p. 423.  
*jugadornata* Solowiow, 1912, t.h. *Anas boschas*. *Echinuria*, p. 331.  
*jugurthæ* Seurat, 1918, t.h. tortoises. *Tachygonetria*, p. 199.
- kachugæ* Baylis and Daubney, 1922, t.h. *Kachuga smithii*. *Camallanus*, p. 378.  
*kachugæ* Stewart, 1914, t.h. *Kachuga lineata*. [Oxysoma]. *Spironoura*, p. 239.  
*kachugæ* Stewart, 1914, t.h. *Kachuga lineata*. *Atractis*, p. 245.  
*\*kashinathi* Lane, 1917, t.h. *Capra hircus*. *Bunostomum*, p. 109.  
*katangensis* Gedoelst, 1916, t.h. *Petrodromus tetradactylus*. [Grammophora]. *Katanga*, p. 417.  
*\*kathlena* Lane, 1914, t.h. *Chelone midas*. *Kathlania*, p. 236.  
*kempi* Baylis and Daubney, 1922, t.h. *Testudo elongata*. *Zanclophorus*, p. 241.  
*kingi* Leiper, 1913, t.h. *Homo*. *Syngamus*, p. 157.  
*kirghisensis* Skrjabin, 1916, t.h. *Aguila imperialis*. [Asc.]. *Porroecæcum*, p. 281.



- kollari* Molin, 1858, t.h. *Chrysophrys aurata*. [Lecanoc.]. *Gæzia*, p. 285.
- kuelzi* Rodenwaldt, 1910, t.h. *Cephalophus maxwelli*. [Fil.]. *Dirofilaria*, p. 394.
- kükenthallii* Cobb, 1888, t.h. *Beluga leucas*. [Asc.]. *Anisakis*, p. 273.
- labialis* Pane, 1864, t.h. *Homo*. [Fil.]. *Gongylonema*, p. 314.
- \**labiata* Creplin, 1825, t.h. *Ciconia nigra*. [Fil.]. *Contortospiculum*, p. 430.
- labiato-papillosa* Aless., 1838, t.h. *Bos taurus*. [Fil.]. *Setaria*, p. 423.
- labiatum* Looss, 1901, t.h. *Equus*. [Cylichnost.]. *Trichonema*, p. 56.
- \**labiatum* var. *digitata* Ihle, 1921, t.h. *Equines*. [Cylicost.]. *Trichonema*, p. 56.
- labiodentata* Linstow, 1899, t.h. *Mus navalis*. [Spiropt.]. *Protospirura*, p. 305.
- labiostrongylus* n. sp., t.h. *Macropus* sp. *Labiostrongylus*, p. 67.
- \**labiotruncata* Molin, 1858, t.h. *Tinamus adpersus*. [Fil.]. *Tetracheilonema*, p. 439.
- labratum* Looss, 1900, t.h. *Equus*. [Cyathost.]. *Trichonema*, p. 56.
- \**lacertæ* Schrank, 1788, t.h. lizards. [Trichoc.]. *Sclerotrichum*, p. 30.
- laciniatus* Molin, 1860, t.h. *Rallus cayennensis*. [Histioc.]. *Schistorophus*, p. 367.
- \**lacrymalis* Gurlt, 1831, in part, t.h. *Equus* cab., *Bos taurus*. [Fil.]. *Thelazia*, p. 318.
- \**lacrymalis* Gurlt of Baillet, 1866, of Railliet, 1893, t.h. *Equus* cab., *Bos taurus*. [Fil.]. *Thelazia*, p. 318.
- lacrymalis* (Gurlt, 1831) Railliet and Henry, 1910, t.h. *Equus* cab. *Thelazia*, p. 318.
- lacustris* Zoega, 1776, t.h. many species of fishes. [Echinor.]. *Camallanus*, p. 378.
- lævicauda* Seurat, 1914, t.h. *Acanthodactylus blanci*, *Scineus officinalis*. [Oxy.]. *Pharyngodon*, p. 194.
- læviconchus* Wedl, 1862, t.h. *Synodontis schaal*. [Cucullanus]. *Procamallanus*, p. 380.
- lævis* Duj., 1845, t.h. *Arvicola subterraneus*, etc. [Str.]. *Heligmosomum*, p. 142.
- lagenorhynchi* Baylis and Daubney, 1925, t.h. *Lagenorhynchus albirostris*. *Halcercus*, p. 172.
- lambediensis* Seurat, 1918, t.h. *Clemmys leprosa*. [Falcaustra]. *Spiromoura*, p. 239.
- lambediensis* Seurat, 1918, t.h. tortoises. *Tachygonetria*, p. 199.
- lamellaris* Linstow, 1906, t.h. *Gavialis gangeticus*. *Typhlophorus*, p. 271.
- lammæ* Steiner, 1921, t.h. *Lamna cornubica*. *Phlyctainophora*, p. 448.
- \**lanceolata* Molin, 1860, t.h. *Crotophaga major*. [Spiropt.]. *Cyrnea*, p. 300.
- lanei* Witenberg, 1925, t.h. elephant. *Murshidia*, p. 79.
- \**laniorum* Molin, 1860, t.h. *Lanius collurio*. [Acuaria]. *Viguiera*, p. 371.
- lappintei* Seurat, 1919, t.h. *Garrulus glandarius cervicalis*. *Acuaria*, p. 329.
- lari* E. Blanchard, 1849, t.h. *Larus ridibundus*. [Cyathost.]. *Syngamus*, p. 157.
- laryngeus* Railliet, 1899, t.h. cattle. *Syngamus*, p. 157.
- laticaudata* Rud., 1819, t.h. *Otis tetrax*. [Spiropt.]. *Histiocephalus*, p. 370.
- laticeps* Rud., 1819, t.h. *Falco lagopus*. [Spiropt.]. *Acuaria*, p. 329.
- laverani* Railliet and Henry, 1912, t.h. *Testudo emys*. *Cissophyllus*, p. 242.
- leesei* Railliet and Henry, 1910, t.h. camel. *Thelazia*, p. 318.
- leidyiella* Travassos, 1915, t.h. *Colaptes maximus*. *Capillaria*, p. 26.
- leidyi* Travassos, 1914, t.h. *Mus norvegicus*. *Capillaria*, p. 26.
- leidyi* Travassos, 1917, t.h. *Bufo americanus*, *Cistudo carolina*. *Oswaldocruzia*, p. 127.
- leiperi* Khalil, 1922, t.h. African elephant. *Leiperenia*, p. 247.
- leiperi* Railliet, 1916, t.h. *Bufo regularis*. [Fil.]. *Foleyella*, p. 395.
- leiperi* Skrjabin, 1924, t.h. *Spermophilopsis leptodactylus*. *Physaloptera*, p. 354.
- lemmi* Retzius, 1841, t.h. *Lemmus amphibius*. [Trichosoma]. *Capillaria*, p. 26.
- leonina* Linstow, 1902, t.h. *Felis leo*. [Asc.]. *Toxascaris*, p. 259.
- leporis* Chandler, 1924, t.h. rabbit. *Nematodirus*, p. 136.
- leporis* Diesing, 1851, t.h. *Lepus timidus*. [Trichosoma]. *Capillaria*, p. 26.
- leporis* Froelich, 1789; Rud., 1809, t.h. *Lepus*. [Trichoc.]. *Trichuris*, p. 23.
- \**leporis pulmonalis* Froelich, 1802; Rud., 1819, t.h. *Lepus timidus*. [Fil.]. *Synthetocaulus*, p. 163.
- \**leporum* Moniez, 1880, t.h. *Lepus cuniculus*, etc. [Spiropt.]. *Graphidium*, p. 135.

- leprincei* Gendre, 1909, t.h. *Macrodipteryx macrodipterus*. [Het.]. *Allodapa*, p. 229.
- leptocephala* Baylis and Daubney, 1922, t.h. *Barbus tor*. [Falconia]. *Spironoura*, p. 239.
- leptocephalus* Rud., 1819, t.h. *Bradypus tridactylus*. [Leiuris]. *Physocephalus*, p. 308.
- \**leptoptera* Rud., 1809, t.h. *Felis leo*. [Asc.]. *Toxocara*, p. 258, or *Toxascaris*, p. 260.
- leptoptera* Rud., 1819, t.h. *Falco buteo*. [Spiropt.]. *Habronema*, p. 297.
- leptoptili* Geddoelst, 1916, t.h. *Leptoptilus crumenifer*. *Echinuria*, p. 331.
- \**leptosomus* (Gervais) Seurat, 1917, t.h. *Uromastix acanthinurus*. [Str.]. *Physaloptera*, p. 353.
- leptostomum* Kotlán, 1920, t.h. *Equines*. [Cyclost.]. *Trichonema*, p. 56.
- leptura* Rud., 1819, t.h. *Testudo mydas*. [Asc.]. *Kathlania*, p. 236.
- leucisci* Hesse, 1923, t.h. *Leuciscus phoxinus*. *Capillaria*, p. 26.
- lhullieri* Seurat, 1916, t.h. *Caccabis petrosa*. *Hadjelia*, p. 302.
- lhullieri* Seurat, 1918, t.h. *Caccabis petrosa*. [Tropidocerca]. *Tetrameres*, p. 363.
- lienalis* Stiles, 1892, t.h. *Bos taurus*. [Fil.]. *Onchocerca*, p. 414.
- limbata* Leidy, 1856, t.h. *Scalops canadensis*. *Physaloptera*, p. 354.
- \**limbata* Railliet and Henry, 1911, t.h. *Canis spp.*, *Homo*. *Toxascaris*, p. 260.
- lineare* Leidy, 1856, t.h. *Felis catus*. [Trichosoma]. *Capillaria*, p. 26.
- linearis* Marotel, 1913, t.h. *Ovis aries*. *Synthetocaulus*, p. 164.
- lineata* Schneider, 1866, t.h. *Gallus sp.* [Het.]. *Ascaridia*, p. 268.
- \**linfatica* Brera, 1810, for *lymphatica* Treutler, 1793. [Amularia]. *Setaria*, p. 423.
- \**linstowi* Hall, 1916, t.h. *Microtus arvalis*. *Heligmosomoides*, p. 146.
- linstowi* Khalil, 1922, t.h. *African elephant*. *Murshidia*, p. 79.
- linstowi* Travassos, 1914, t.h. *Crocodyrus russulus*, *Talpa europæa*. *Capillaria*, p. 26.
- linstowi* Travassos, 1918, t.h. *Talpa europæa*. *Viannaia*, p. 150.
- linstowi* nom. nov., t.h. *Bufo viridis*. *Aplectana*, p. 209.
- loa* Guyot, 1778, t.h. *Homo*. [Fil.]. *Loa*, p. 417.
- lobulata* Schneider, 1866, t.h. *Delphinus gangeticus*. [Asc.]. *Contracæcum*, p. 282.
- longchoptera* Diesing, 1851, t.h. *Elephas indicus*. [Asc.]. *Toxocara*, p. 258.
- longicaudata* Linstow, 1879, t.h. *Megacephalon maleo*. *Heterakis*, p. 216.
- longecirrata* Linstow, 1789, t.h. *Geopelia sp. ?* [Het.]. *Ascaridia*, p. 268.
- longecirratus* Linstow, 1879, t.h. *Bos grunniens*. [Str.]. *Bunostomum*, p. 109.
- longemacronatus* Molin, 1861, t.h. *Sus scrofa dom.* *Globocephalus*, p. 48.
- longeornatus* Molin, 1860, t.h. *Ciconia maguari*. [Disph.]. *Echinuria*, p. 331.
- longespiculum* Railliet and Henry, 1916, t.h. *Rana temp.* *Oxysomatium*, p. 203.
- longesubulatum* Molin, 1861, t.h. *Cervus campestris*, *C. rufus*. *Eucyathostomum*, p. 85.
- longevaginatium* Linstow, 1879, t.h. *Alauda arvensis*. [Trichosoma]. *Capillaria*, p. 26.
- \**longevaginatus* Diesing, 1851, t.h. *Homo*. [Str.]. *Metastrongylus*, p. 160.
- longevaginatus* Molin, 1860, t.h. *Ciconia maguari*. [Disph.]. *Acuaria*, p. 329.
- longibursa* Neveu-Lemaire, 1924, t.h. *African rhinoceros*. *Buissonia*, p. 81.
- longibursatum* Yorke and Macfie, 1918, t.h. *Equines*. [Cyclost.]. *Trichonema*, p. 56.
- longicauda* Leiper, 1911, t.h. *zebra*. *Cylindropharynx*, p. 64.
- longicaudatus* Baylis, 1919, t.h. *Rhinoceros sumatrensis*. *Crossocephalus*, p. 250.
- longicirrus* Dujardin, 1845, t.h. *Pleuronectes platessa*. *Helignus*, p. 288.
- longicollis* Rud., 1819, t.h. *Phasianus gallus*, etc. [Trichosoma]. *Capillaria*, p. 26.
- \**longicollis* Drasche, 1885, not Schneider, 1866, t.h. *Testudo græca*. [Oxy.]. *Tachygonetria*, p. 200.
- longicollis* Schneider, 1866, t.h. *Testudo græca*. [Oxy.]. *Tachygonetria*, p. 199.
- longicollis* Stossich, 1899, t.h. *Mullus barbatus*. [Dacnitis]. *Cucullanus*, p. 383.
- longicornis* Hemprich and Ehrenberg, 1866, t.h. *Numenius arquatus*, etc. [*Ancyra-canthus*]. *Schistorophus*, p. 367.
- longifilum* Duj., 1845, t.h. *Accentor modularis*. [Calodium]. *Capillaria*, p. 26.
- longipes* Ransom, 1911, t.h. *Antilocapra americana*, *Ovis aries*. *Capillaria*, p. 26.
- longispiculata* nom. nov., t.h. *Tarandus rangifer*. *Nematodirella*, p. 140.
- longispiculum* Sonsino, 1889, t.h. *Python molurus*. [Trichosoma]. *Capillaria*, p. 23.

- longissima* Ortlepp, 1922, t.h. snakes. Physaloptera, p. 354.
- \**longissime spiculatus* Romanovitch, 1915, t.h. *Tarandus rangifer*. [Microc.]. *Nematodirella*, p. 140.
- longistipes* Railliet and Henry, 1909, t.h. dromedary. *Hæmonchus*, p. 123.
- longistriata* Walton, 1923, t.h. *Colaptes auratus luteus*. *Capillaria*, p. 26.
- \**longus* Grassi and Segré, 1885, t.h. *Lepus cuniculus*. [Rhabdonema]. *Strongyloides*, p. 20.
- \**loveridgei* Baylis, 1920, t.h. *Mungos fasciatus*. *Subulura*, p. 228.
- lumbricoides* Linnæus, 1758, t.h. *Homo*. *Ascaris*, p. 256.
- lunatus* Travassos, 1914, t.h. *Bos taurus*. *Hæmonchus*, p. 123.
- lutzi* Barreto, 1918, t.h. *Strix* sp. *Subulura*, p. 228.
- lutzi* Travassos, 1918, t.h. *Penelope* sp. *Thelazia*, p. 318.
- \**lymphatica* Treutler, 1793, t.h. *Homo*. [Hamularia]. *Setaria*, p. 423.
- \**macaci* Smith, Fox, and White, 1908, t.h. *Macacus nemestrinus*. [Globoc.]. *Ternidens*, p. 89.
- macdonaldi* Bell, 1881, for *macdonaldii* Dobson, 1880. *Rictularia*, p. 345.
- macdonaldi* Thapar, 1924, t.h. *Rhinoceros africanus*. *Kiluluma*, p. 71.
- macdonaldii* Dobson, 1880, t.h. *Megaderma frons*. [Pterygodermatites]. *Rictularia*, p. 345.
- macieli* Travassos, 1915, t.h. *Tatus novemcinctus*. [Trichostr.]. *Cooperia*, p. 132.
- macrolaima* Gendre, 1922, t.h. a fish. *Rhabdochona*, p. 325.
- macrolaimus* Linstow, 1899, t.h. *Testudo pardalis*. [Oxy.]. *Tachygonetria*, p. 199.
- macrolaimus* Linstow, 1906, t.h. *Plotus melanogaster*. [Disph.]. *Acuaria*, p. 329.
- macronis* Stewart, 1914, t.h. *Macrones aor*. [Het.]. *Subulura*, p. 228.
- macrophallos* Parona, 1889, t.h. *Hydrosaurus salvator*. [Fil.]. *Diplotriæna*, p. 434.
- macropodis* Chandler, 1924, t.h. *Macropus bennetti*. *Austrostrongylus*, p. 138.
- macropodis* n.sp., t.h. *Macropus* sp. *Pharyngostrongylus*, p. 67.
- macropodis* n.sp., t.h. *Macropus* sp. *Globocephaloides*, p. 174.
- macropostrongylus* n.sp., t.h. *Macropus* sp. *Macropostrongylus*, p. 75.
- \**macrostoma* Linstow, 1875, t.h. *Angius fragilis*. [Angiost.]. *Rhabdias*, p. 18.
- macroura* Linstow, 1883, t.h. *Megaloperdix nigelii*. *Heterakis*, p. 216.
- maculosa* Rud., 1802, t.h. *Columba dom. gutturosa*. [Asc.]. *Ascaridia*, p. 268.
- magalhãesii* R. Blanchard, 1895, t.h. *Homo*. [Fil.]. *Dirofilaria*, p. 394.
- magalhãesii* Travassos, 1913, t.h. *Geotrygon montana*. *Ascaridia*, p. 268.
- magna* Taylor, 1925, t.h. *Trochurus declivus*, *Sparus* sp. [Habronema]. *Metabronema*, p. 299.
- magna* Thapar, 1924, t.h. *Rhinoceros africanus*. *Kiluluma*, p. 71.
- magnilabiatius* Molin, 1860, t.h. *Platalea ajaja*. [Disph.]. *Acuaria*, p. 329.
- magnipapilla* Linstow, 1906, t.h. *Lyrurus tetrrix*. *Ascaridia*, p. 268.
- magnipapilla* Molin, 1860, t.h. *Myrmecophaga bivittata*. *Physaloptera*, p. 354.
- major* Leiper, 1910, t.h. *Felis leo sabakiensis*. *Lagochilascaris*, p. 261.
- \**major* Raspail, 1829, t.h. *Delphinus phocæna*. [Str.]. *Pseudalius*, p. 168.
- malapteruri* Baylis, 1923, t.h. *Malapterurus electricus*. *Dujardinia*, p. 277.
- malayana* Aless., 1905, t.h. *Helarectos (Ursus) malayanus*. [Unc.]. *Ancylostoma*, p. 93.
- malayense* Ortlepp, 1922, t.h. *Felis chaus*, *Felis tigris*, etc. [Physaloptera]. *Chlamydonema*, p. 356.
- malleus* Linstow, 1883, t.h. *Corvus cornix*. *Physaloptera*, p. 354.
- mamillaris* Molin, 1860, t.h. *Corvus cajanus*. [Disph.]. *Acuaria*, p. 329.
- mamillata* Linstow, 1897, t.h. *Plestiodon aldrovandi*. [Oxy.]. *Pharyngodon*, p. 194.
- manica* Duj., 1845, t.h. *Fringilla cœlebs*. [Thominx.]. *Capillaria*, p. 26.
- mansioni* Seurat, 1914, t.h. *Buteo vulgaris*. *Habronema*, p. 297.
- mansonii* Cobbold, 1879, t.h. *Gallus gallus*. [Fil.]. *Oxyspirura*, p. 320.
- \**marginata* Rud., 1802, t.h. *Canis dom.* [Asc.]. *Toxocara*, p. 258.

- \**marginata* Rud., 1802, of Leiper, 1907, t.h. *Canis* dom. *Toxascaris*, p. 260.  
*marinus* O. F. Mueller, 1779, t.h. *Gadus morrhua*. *Cucullanus*, p. 383.
- \**markusi* Ihle, 1920, t.h. Equines. [*Hexodontostomum*]. *Poteriostomum*, p. 61.  
*marshalli* Boulenger, 1921, t.h. cattle. *Setaria*, p. 423.  
*marshalli* Ransom, 1907, t.h. *Ovis aries*. *Ostertagia*, p. 125.  
*marthæ* Seurat, 1917, t.h. rock partridge. *Lemdana*, p. 404.  
*martis* Gmelin, 1790, t.h. *Mustela foina*, etc. *Filaria*, p. 390.  
*mascula* Rud., 1819, t.h. *Coluber* sp. [Asc.]. *Spirooura*, p. 239.  
*masculior* Railliet and Henry, 1911, t.h. *Fennecus zerda*. [Belasc.]. *Toxocara*, p. 258.  
*massiniæ* Seurat, 1918, t.h. tortoise. *Tachyonetria*, p. 199.
- \**mastigodes* Nitzsch, 1857, t.h. *Equus* cab. *Oxyuris*, p. 185.  
*matronensis* Railliet and Henry, 1910, t.h. *Corvus cornix*. *Aprocta*, p. 405.  
*mauritanicus* Maupas and Seurat, 1912, t.h. dromedary. *Nematodirus*, p. 137.  
*mavis* Leiper, 1909, t.h. *Turdus musicus*. [Fil.]. *Aprocta*, p. 405.  
*maxillaris* Molin, 1860, t.h. *Mephitis chinché*. *Physaloptera*, p. 354.  
*medinensis* Linnæus, 1758, t.h. *Homo*. [Fil.]. *Dracunculus*, p. 442.  
*mediospiralis* Molin, 1860, t.h. *Dasyprocta agouti*, *Tapirus americanus*. [Spiropt.]. *Physocephalus*, p. 309.
- \**megaloccephala* Cloquet, 1824, t.h. *Equus* cab. [Asc.]. *Parascaris*, p. 262.  
*megalocerca* Skrjabin, 1916, t.h. Geckonidæ. *Pharyngodon*, p. 194.  
*megalochila* Diesing, 1851, t.h. *Zacholus austriacus*. [Fil.]. *Tricheilonema*, p. 447.  
*megaloon* Geddoelst, 1917, t.h. *Sciurus prevosti*. *Trichuris*, p. 23.  
*megalostoma* Creplin, 1829, th. *Falco nisus*. *Physaloptera*, p. 354.  
*megastoma* Rud., 1819, t.h. *Equus*. [Spiropt.]. *Habronema*, p. 298.  
*megatyphlon* Rud., 1819, t.h. *Lacerta iguana*. [Asc.]. *Ozolaimus*, p. 191.  
*melanocephalus* Rud., 1819, t.h. *Scomber colias*, etc. [*Cucullanus*]. *Camallanus*, p. 378.  
*meleagris-gallopavo* Barile, 1912, t.h. *Meleagris gallopavo* dom. [*Trichosomum*]. *Capillaria*, p. 26.
- melis* Geddoelst, 1920, t.h. badger. [Belascaris]. *Toxocara*, p. 258.  
*membranosa* Schneider, 1866, t.h. *Rana* sp. [Leptodera]. *Aplectana*, p. 209.  
*memphisia* Khalil, 1922, t.h. African elephant. [Memphisia]. *Murshidia*, p. 80.  
*mentulata* Railliet and Henry, 1909, t.h. dromedary. *Ostertagia*, p. 125.  
*mephites* Solanet, 1909, t.h. *Mephites suffocans*. *Physaloptera*, p. 354.  
*mettami* Leiper, 1913, t.h. *Equus* cab. [Cylicost.]. *Trichonema*, p. 56.  
*micipsæ* Seurat, 1917, t.h. *Chalcides micipsæ*. *Thelandros*, p. 193.  
*microanalis* Skrjabin, 1917, t.h. *Erithacus* sp. *Aprocta*, p. 405.  
*microcephala* Rud., 1809, t.h. *Ardea comata*. [Asc.]. *Contracæcum*, p. 282.  
*microcephalus* Duj., 1845, t.h. *Emys orbicularis*. [*Cucullanus*]. *Camallanus*, p. 378.  
*microlaimus* Linstow, 1899, t.h. *Testudo pardalis*. [Oxy.]. *Tachyonetria*, p. 199.  
*micropapillata* Stossich, 1890, t.h. *Pelecanus* sp. [Asc.]. *Contracæcum*, p. 282.  
*micropenis* Travassos, 1915, t.h. *Nicticorax violacens*, *Cancroma cochlearia*. *Tetrameres*, p. 363.
- \**microptera* Rud., 1819, t.h. *Canis lupus*. [Asc.]. *Toxascaris*, p. 260.  
*microspiculum* Skrjabin, 1915, t.h. *Phalacrocorax carbo*. *Syngamus*, p. 157.  
*microstoma* Drasche, 1884, t.h. *Testudo græca*. [Oxy.]. *Mehdiella*, p. 201.  
*microstoma* Schneider, 1866, t.h. *Equus* cab. [Fil.]. *Habronema*, p. 298.  
*micrurus* Daubney, 1923, t.h. *Macrelaps microlepidotus*. [*Diaphanocephalus*]. *Kalicephalus*, p. 114.
- \**micrurus* Mehlis, 1831, t.h. *Bos taurus*. [Str.]. *Dictyocaulus*, p. 162.  
*mingazzinii* Rizzo, 1902, t.h. *Tropidonotus natrix*. [*Trichosoma*]. *Capillaria*, p. 26.  
*minima* Travassos, 1914, t.h. *Tachyphonus cristatus bruneus*. *Tetrameres*, p. 363.  
*minimum* Linstow, 1906, t.h. *Felis rubiginosa*. [*Ankylostomum*]. *Ancylostoma*, p. 93.  
*minimum* Molin, 1857, t.h. *Mus musculus*. *Gongylonema*, p. 314.

- minor* Kuhn, 1829, t.h. *Delphinus phocaena*. [Str.]. *Stenurus*, p. 169.
- minor* Leiper, 1909, t.h. *Homo. Lagochilascaris*, p. 260.
- minor* Looss, 1900, t.h. *Equus*. [Triodontus]. *Triodontophorus*, p. 45.
- minuscule* Travassos, 1915, t.h. *Tamandua tetradactyla*. *Viannaia*, p. 150.
- minuta* Beneden, 1873, t.h. *Vespertilio dasycneme*. *Ascarops*, p. 386.
- minuta* Schneider, 1866, t.h. *Ateles paniscus*, *Mycetes seniculus*. [Oxy.]. *Enterobius*, p. 188.
- minutum* Yorke and Macfie, 1918, t.h. *Equines*. [Cylicost.]. *Trichonema*, p. 56.
- minutus* Baylis and Daubney, 1922, t.h. *Naja tripudians*. [Diaphanocephalus]. *Kalicephalus*, p. 114.
- minutus* Duj., 1845, t.h. *Mus sylvaticus*, etc. [Str.]. *Heligmosomum*, p. 142.
- minutus* Rud., 1819, t.h. *Pleuronectes passer*. [Cucullanus]. *Histiocephalus*, p. 370.
- mittelli* Sambon, 1907, t.h. *Pedetes caffer*. *Wellcomia*, p. 197.
- modiglianii* Parona, 1897, t.h. *Trimeresurus formosus*. [Trichosoma]. *Capillaria*, p. 26.
- molini* Railliet, 1898, t.h. *Dicotyles albirostris*. [Str.]. *Nematodirus*, p. 137.
- mombasica* Baylis, 1921, t.h. *Psammophis subtaeniatus*. *Ophidascaris*, p. 263.
- monacanthus* Diesing, 1853, t.h. *Tenebrio molitor*. *Cephalacanthus*, p. 386.
- monhystera* Linstow, 1902, t.h. *Metopoceros (Iguana) cornutus*. [Oxy.]. *Macracis*, p. 191.
- monodens* Molin, 1860, t.h. *Boa constrictor*. *Physaloptera*, p. 354.
- \**monodon* Linstow, 1882, t.h. *Oidemia nigra*. [Str.]. *Amidostomum*, p. 153.
- monopterum* Gendre, 1923, t.h. nocturnal birds of prey. *Habronema*, p. 298.
- montgomeryi* Boulenger, 1920, t.h. *Equines*. [Cylicost.]. *Trichonema*, p. 56.
- monticelliana* Stossich, 1892, t.h. *Otis tarda*. *Heterakis*, p. 216.
- mordens* Leiper, 1908, t.h. *Homo*. *Physaloptera*, p. 354.
- morruæ* Beneden, 1871, t.h. *Gadus morrhua*. *Ascarophis*, p. 386.
- moucheti* Railliet, 1918, t.h. *Thryonomys swinderianus*. *Acheilostoma*, p. 49.
- \**mucronata* Froelich, 1791, not Schrank, 1780, t.h. *Anas*. [Asc.]. *Amidostomum*, p. 153.
- mucronatum* Ihle, 1920, t.h. *Equines*. [Cylicost.]. *Craterostomum*, p. 45.
- mucronatum* Molin, 1858, t.h. *Mustela foina*. [Calodium]. *Capillaria*, p. 26.
- mucronatum* Molin, 1861, t.h. *Dasypus gilvipes*. [Diploodon]. *Ancylostoma*, p. 93.
- mucronatum* Seurat, 1916, t.h. *Erinaceus algirus*. *Gongylonema*, p. 314.
- mucronatus* Molin, 1861, t.h. *Crotalus horridus*. *Kalicephalus*, p. 114.
- \**mucronatus* Schlotthauber, 1860, t.h. *Picus canis*, *P. major*. *Syngamus*, p. 157.
- multidentatus* Baylis and Lane, 1920, t.h. *Urogymnus asperimus*. *Echinocephalus*, p. 343.
- multiapillata* Drasche, 1882, t.h. *Tantalus loculator*. [Asc.]. *Contracæcum*, p. 282.
- multiapillosa* Condamine and Drouilly, 1878, t.h. *Equus cab.* [Fil.]. *Parafilaria*, p. 392.
- muricola* Geddoelst, 1916, t.h. rat. *Protopirura*, p. 305.
- murinæ* Travassos, 1914, t.h. *Eunectes murina*. *Capillaria*, p. 26.
- muris* Gmelin, 1790, t.h. *Mus decumanus*. [Asc.]. *Protopirura*, p. 305.
- muris* Schrank, 1788, t.h. *Mus musculus*. [Trichoc.]. *Trichuris*, p. 23.
- muris* Yokogawa, 1920, t.h. rat. [Heligmosomum]. *Nippostrongylus*, p. 148.
- muris-brasiliensis* Diesing, 1861, t.h. *Mus brasiliensis*. *Physaloptera*, p. 354.
- muris-musculi* Diesing, 1861, t.h. *Mus musculus*. [Trichosoma]. *Capillaria*, p. 26.
- muris-sylvatici* Diesing, 1861, t.h. *Mus sylvaticus*. [Trichosoma]. *Capillaria*, p. 26.
- murshida* Lane, 1914, t.h. *Elephas indicus*. *Murshidia*, p. 79.
- musæ* Carter, 1861, t.h. larval stage in *Musca dom.*, adult in *Equines*. [Fil.]. *Habronema*, p. 297.
- muscapæ* Linstow, 1878, t.h. *Muscicapa atricapilla*. [Fil.]. *Acuaria*, p. 329.
- \**musculi* Rud., 1819, t.h. *Mus musculus*. [Fil.]. *Gongylonema*, p. 314.
- \**mustelorum* Rud., 1809, t.h. *Mustela foina*, etc. *Filaria*, p. 391.

- mustelarum* (Rud., 1819) Beneden, 1858, t.h. *Mustela foina*, etc. Filaroides, p. 439.
- \**mustelarum pulmonalis* Rud., 1819, t.h. *Mustela foina*, etc. [Fil.] Filaroides, p. 439.
- \**muticus* Mueller, 1777, t.h. *Gadus morrhua*. Cucullanus, p. 381.
- muwanze* Daubney, 1924, t.h. warthog, roan antelope. Oesophagostomum, p. 87.
- mycetis* nom. nov., t.h. *Micetes coraya*. Ancylostoma, p. 93.
- myoxi-nitela* Diesing, 1851, t.h. *Myoxus nitela*. [Trichosoma]. Capillaria, p. 26.
- mystax* Zeder, 1800, t.h. *Felis dom.* [Fus.] Toxocara, p. 258.
- naia* Geddoelst, 1916, t.h. *Naja nigricollis*. [Asc.] Ophidascaris, p. 263.
- \**nanum* Ihle, 1919, t.h. Equines. [Cylicost.] Trichonema, p. 56.
- narium* Linstow, 1901, t.h. *Buteo* sp. Aprocta, p. 405.
- nasicola* Linstow, 1899, t.h. *Capra hircus*, *Cervus rufus*. Syngamus, p. 157.
- nasilonis* Geddoelst, 1916, t.h. *Nasilio brachyrhynchus*. Physaloptera, p. 354.
- nassatum* Looss, 1900, t.h. Equus. [Cyathost.] Trichonema, p. 56.
- nassatum* var. *parva* Yorke and Macfie, 1918, t.h. Equines. [Cylicost.] Trichonema, p. 56.
- nasua* Darling, 1911, t.h. *Nasua nasica panamensis*. Strongyloides, p. 20.
- nasuta* Rud., 1819, t.h. *Fringilla dom.* [Spiropt.] Acuaria, p. 329.
- nasuta* Schneider, 1866, t.h. *Pelecanus onocrotalus*. [Asc.] Contracacum, p. 282.
- \**nattereri* Cobbold, 1879, t.h. *Sus scrofa* dom. Stephanurus, p. 52.
- nattereri* Travassos, 1923, t.h. *Crax blumenbachii*. Heterakis, p. 216.
- neglecta* Diesing, 1851, t.h. *Pelophylax escul.* [Fil.] Icosiella, p. 425.
- neglecta* Diesing, 1851, t.h. *Thynnus vulg.* Oncophora, p. 31.
- neglectus* Jægerskiöld, 1909, t.h. *Numenius arquatus*, etc. Hystrichis, p. 181.
- nematodiriformis* Travassos, 1918, t.h. Muridae. Heligmosomum, p. 143.
- neoplastica* Fibiger and Ditlevsen, 1914, t.h. *Mus decumanus*, etc. [Spiropt.] Gongylonema, p. 314.
- neotoma* Hall, 1916, t.h. *Neotoma cinerea rupicola*, etc. Nematodirus, p. 137.
- neveu-lemairi* Witenberg, 1925, t.h. elephant. [Pterygopharynx, misprint for Peridopharynx]. Murshidia, p. 80.
- nicollei* Seurat, 1918, t.h. tortoise. Tachygonetria, p. 199.
- nidifer* Linton, 1900, t.h. *Galeocerdo tigrinus*. Acanthocheilus, p. 288.
- nigeriae* Leiper, 1911, t.h. large rodent. Trachypharynx, p. 64.
- nigeriensis* Ortlepp, 1923, t.h. Nigerian snake. Kalicephalus, p. 114.
- nigra* Geddoelst, 1916, t.h. *Crocodylus niloticus*. [Asc.] Dujardinia, p. 277.
- nigrescens* Linstow, 1906, t.h. *Rana hexadactyla*. [Cucullanus]. Camallanus, p. 378.
- \**nigrovenosa* Geeze, 1800, t.h. frogs, toads. [Asc.] Rhabdias, p. 18.
- \**ninnii* Stossich, 1891, t.h. *Corvus cornix*. [Fil.] Diplotriena, p. 434.
- nitida* Travassos, 1919, t.h. Cobra sp. [Florencioia]. Spironoura, p. 233.
- noctuae* Seurat, 1913, t.h. Carine noctua glaux. Acuaria, p. 330.
- noctuae* Seurat, 1914, t.h. Carine noctua glaux. Alloodapa, p. 229.
- \**nodosus* Rud., 1809, t.h. *Mus musculus*. [Trichoc.] Trichuris, p. 23.
- \**nodularis* Rud., 1809, t.h. Anser. [Str.] Amidostomum, p. 153.
- nodulosa* Rud., 1820, t.h. *Lanius collurio*. [Fil.] Contortospiculum, p. 430.
- nodulosus* Rud., 1803, t.h. Anser. [Str.] Amidostomum, p. 153.
- noeneri* Railliet and Henry, 1907, t.h. deer. Dictyocaulus, p. 162.
- nouveli* Seurat, 1914, t.h. *Himantopus himant.* [Tropidoerca]. Tetrameres, p. 363.
- nouveli* Seurat, 1915, t.h. *Genetta afra bonapartei*. Habronema, p. 298.
- nudicauda* Ortlepp, 1924, t.h. deer. Setaria, p. 423.
- \**numidæ* Leiper, 1908, t.h. *Numida ptilorhyncha*. Heterakis, p. 216.
- numidica* Seurat, 1914, t.h. *Felis ocreata*. Protospirura, p. 305.
- numidica* Seurat, 1915, t.h. *Vulpes vulpes atlantica*. [Alloodapa]. Numidica, p. 230.
- numidica* Seurat, 1917, t.h. *Dipodillus campestris*. Physaloptera, p. 354.
- numidica* Seurat, 1917, t.h. *Lepus pallidior*, *L. kabylicus*. [Fil.] Micipsella, p. 419.
- numidica* Seurat, 1918, t.h. tortoise. Tachygonetria, p. 200.

- numidica* Seurat, 1920, t.h. heron. [Desmidocerca]. Desmidocercella, p. 321.  
*numidicum* Seurat, 1917, t.h. *Rana ridibunda*. [Porrocæcum]. Angusticæcum, p. 279.  
*numidicus* Seurat, 1917, t.h. *Fennecus zerda*. Streptopharagus, p. 312.  
*numidicus* Seurat, 1918, t.h. tortoise. Thelandros, p. 193.
- obconica* Baird, 1860, t.h. *Uranops angulatus*. [Asc.]. Ophidascaris, p. 263.  
*obesa* Diesing, 1851, t.h. *Hydrocerus capybara*. [Oxy.]. Protozoophagâ, p. 191.  
*obesa* Seurat, 1915, t.h. *Caccabis petrosa spatzi*. Hartertia, p. 305.  
*obliquus* Daubney, 1923, t.h. *Bitis arietans*, *B. gabonica*, etc. [Diaphanocephalus].  
 Kalicephalus, p. 114.
- \**obtusa* Rud., 1819, t.h. *Mus musculus*. [Spiropt.]. Protospirura, p. 305.  
*obtusa* Rud., 1802, not Schneider, 1866, t.h. *Hirundo rustica*. [Fil.]. Diplotriæna, p. 434.
- \**obtusæ-caudatum* Diesing, 1861, t.h. Brazilian birds. [Monopetalonema]. Contortospiculum, p. 430.  
*obtusissima* Molin, 1860, t.h. *Bothrops jararaca*, etc. Physaloptera, p. 354.  
*obtususcolum* Rud., 1819, t.h. *Ardea grus*. [Trichosoma]. Capillaria, p. 26.
- \**obtusæ-caudata* Rud., 1819, t.h. *Picus lineatus*. [Fil.]. Contortospiculum, p. 430.  
*obtusus* Duj., 1845, t.h. *Caprimulgus europæus*. [Eucamptus]. Coronofilaria, p. 411.  
*obtusus* Duj., 1845, t.h. *Scyllium catulus*. Proleptus, p. 358.  
*obelata* Creplin, 1825, t.h. *Larus maximus*, etc. [Spiropt.]. Cosmocephalus, p. 338.  
*obelata* Rud., 1802, t.h. *Mus musculus*. [Asc.]. Syphacia, p. 195.  
*occidentalis* Ransom, 1907, t.h. *Ovis aries*. Ostertagia, p. 125.  
*ocreatus* Railliet and Henry, 1907, t.h. sheep. Synthetocaulus, p. 164.  
*octocornutus* Molin, 1860, t.h. *Psittacus macao*. Elaphocephalus, p. 439.  
*oculata* Linstow, 1899, t.h. *Python reticulatus*. [Asc.]. Polydelphis, p. 266.  
*oldi* Goodey, 1924, t.h. warthog, roan antelope. Cæstrophagostomum, p. 87.  
*olympioi* Barreto, 1918, t.h. *Crypturus parvirostris*, etc. Subulura, p. 228.  
*omænsis* Neveu-Lemaire, 1924, t.h. African rhinoceros. [Pteridopharynx].  
 Murshidia, p. 80.
- \**omra* Lane, 1914, t.h. *Elephas indicus*. Amira, p. 83.  
*oncophorus* Railliet, 1898, t.h. cattle. [Str.]. Cooperia, p. 132.  
*opaca* Barker and Noyes, 1915, t.h. *Fiber zibethicus*. Trichuris, p. 23.  
*opætura* Leidy, 1891, t.h. *Cyclura bæolopha*. Atractis, p. 245.  
*ophidia* Goodey, 1924, t.h. *Coluber leopardinus*. Rhabdias, p. 18.
- \**ophisauris* Froriep MS. in Rud., 1809, t.h. *Lacerta apus*. [Trichoc.]. Sclerotrichum, p. 30.  
*ophthalmica* Linstow, 1903, t.h. *Turnix taigor*. [Cheilospirura]. Oxyspirura, p. 320.  
*ophthalmicus* Linstow, 1898, t.h. *Carpophaga brechleyi*. [Ancyracanthus]. Ceratospira, p. 322.  
*ophthalmophaga* Stossich, 1902, t.h. *Falco* sp. Aprocta, p. 405.  
*orbitalis* Linstow, 1901, t.h. *Falco fuscoater*. Aprocta, p. 406.  
*orestæ* Moniez, 1889, t.h. *Orestias mülleri*. Hedruris, p. 376.  
*orientale* Yokogawa, 1925, t.h. rodents. Gongylonema, p. 314.  
*orientalis* Jimbo, 1914, t.h. *Homo*. Trichostrongylus, p. 119.  
*orispinus* Molin, 1858, t.h. *Ibis falcinellus*. Hystrichis, p. 181.  
*orispinus* Molin, 1861, t.h. *Anas anser dom*, etc. [Str.]. Epomidiostomum, p. 156.  
*ornata* Cram, 1924, t.h. zebra. Cylindropharynx, p. 65.  
*ornata* Duj., 1845, t.h. *Rana esculata*, *R. temporaria*. [Oxy.]. Cosmocerca, p. 207.  
*ornata* Linstow, 1897, t.h. *Stellio vulg.* [Het.]. Strongyluris, p. 223.
- \**ornata* Walter, 1856, not Duj., 1845, t.h. *Triton alpestris*. [Oxy.]. Cosmocerca, p. 207.  
*ornatum* Duj., 1843, t.h. *Anthus pratensis*. [Trichosoma]. Capillaria, p. 26.  
*ornatum* Kotlán, 1919, t.h. Equines. [Cylicost.]. Trichonema, p. 56.

- \**ornatus* Dujardin of Schneider, 1866, t.h. *Rana temporaria*, *R. esculenta*, etc. [Nematoxys]. *Cosmocerca*, p. 207.
- ornatus* Gendre, 1912, t.h. *Corvus scapulatus*. [Disph.]. *Acuaria*, p. 330.
- orthocerca* Stoss., 1902, t.h. *Rhea americana*. [Het.]. *Ascaridia*, p. 268.
- ortleppi* Thapar, 1925, t.h. *Podocnemis unifilis*. *Atractis*, p. 245.
- oscari* Travassos, 1923, t.h. *Tropidurus* sp. *Strongyluris*, p. 223.
- osculata* Rud., 1802, t.h. *Phoca vitulina*. [Asc.]. *Contracæcum*, p. 282.
- osleri* Cobbold, 1879, t.h. *Canis* fam. [Fil.]. *Oslerus*, p. 386.
- \**os-papillatum* Piana and Stazzi, 1900, t.h. *Elephas indicus*. [Unc.]. *Bathmostomum*, p. 105.
- ostertagi* Stiles, 1892, t.h. *Bos taurus*. [Str.]. *Ostertagia*, p. 125.
- otolicni* Beneden, 1890, t.h. *Otolicnus peli*. [Str.]. *Subulura*, p. 228.
- ovalis* Linstow, 1907, t.h. *Podiceps cristatus*. [Asc.]. *Contracæcum*, p. 282.
- ovata* Linstow, 1907, t.h. *Astur melanoleucus*. [Physalopt.]. *Cyrnea*, p. 300.
- ovata* Zeder, 1803, t.h. *Cyprinus gobio*. [Fil.]. *Philometra*, p. 443.
- ovatus* Linstow, 1906, t.h. *Hylobates syndactylus*, *H. agilis*. [Str.]. *Oesophagostomum*, p. 87.
- ovatus* Linstow, 1910, t.h. *Delphinus tursio*. [Pseudalius]. *Stenurus*, p. 170.
- oviflagellis* Fourment, 1883, t.h. *Merlangus vulgaris*. *Spinitectus*, p. 349.
- ovinus* Fabricius, 1788 or 1794, t.h. *Ovis aries*. [Str.]. *Chabertia*, p. 89.
- \**ovinus* Gmelin, 1790, t.h. *Ovis aries*. [Str.]. *Chabertia*, p. 89.
- ovis* Abildgaard, 1795, t.h. *Ovis aries*, *Bos taurus*. [Trichoc.]. *Trichuris*, p. 23.
- ovis* Rud., 1819, t.h. *Ovis dom.* *Ascaris*, p. 257.
- ovocinctus* Ransom, 1911, t.h. *Antilocapra americana*. *Strongyloides*, p. 20.
- ovopunctatum* Linstow, 1873, t.h. *Sturnus vulg.* [Trichosoma]. *Capillaria*, p. 26.
- oxyascaris* Travassos, 1926, t.h. *Drymobius bifossatus*. *Oxyascaris*, p. 214.
- oxycephalus* Ward and Magath, 1916, t.h. white bass, black crappie. *Camallanus*, p. 378.
- ozouri* Railliet and Henry, 1909, t.h. *Faudias madagascariensis*. *Diplotriæna*, p. 433.
- pachicephalus* Molin, 1861, t.h. *Cygnus olor*. *Hystrichis*, p. 181.
- pachycephalum* Molin, 1861, t.h. *Cercopithecus nictitans*, *C. sabæus*. *Oesophagostomum*, p. 87.
- pachyderma* Linstow, 1877, t.h. *Podiceps minor*. [Trichosoma]. *Capillaria*, p. 26.
- pachyderma* Thapar, 1924, t.h. *Rhinoceros africanus*. *Kiluluma*, p. 71.
- pachykeramotum* Wedl, 1856, t.h. *Felis guttata*. [Trichosoma]. *Capillaria*, p. 27.
- pachyscelis* Railliet and Henry, 1910, t.h. sheep, cattle. *Gaigeria*, p. 101.
- \**pachystomus* Linstow, 1873, t.h. *Bliccopsis rutiloides*. [Cucullanus]. *Rhabdochona*, p. 324.
- pallaryi* Seurat, 1915, t.h. *Xerus getulus*. [Oxy.]. *Syphacia*, p. 196.
- pallaryi* Seurat, 1917, t.h. *Agama bibroni*. *Physaloptera*, p. 354.
- \**pallasi* Beneden, 1870, t.h. *Beluga leucus*. [Str.]. *Stenurus*, p. 170.
- \**palpebrarum* Baillet, 1858, t.h. *Bos taurus*. [Fil.]. *Thelazia*, p. 318.
- papillatus* Linstow, 1882, t.h. *Otis tarda*. [Str.]. *Ornithostromgylus*, p. 128.
- papillifer* Linstow, 1877, t.h. *Hirundo urbica*. [Trichosoma]. *Capillaria*, p. 27.
- papillifera* Linstow, 1878, t.h. *Sylvia palustris*. [Fil.]. *Acuaria*, p. 330.
- papillifera* Linstow, 1898, t.h. a snake. [Asc.]. *Ophidascaris*, p. 263.
- papilliferus* Molin, 1858, t.h. *Accipenser sturio*. [Cucullanus]. *Camallanus*, p. 378.
- papilligerum* Railliet and Henry, 1911, t.h. *Tetrao urogallus*. [Trichosoma]. *Capillaria*, p. 27.
- papilloradiata* Linstow, 1899, t.h. *Canis lupus*. *Physaloptera*, p. 354.
- \**papillosa* Bloch, 1782, in part, t.h. bustard. [Asc.]. *He'erakis*, p. 216.
- papillosa* Molin, 1860, t.h. *Corvus cajanus*. [Asc.]. *Subulura*, p. 228.
- papillosa* Molin, 1860, t.h. *Falco destructor*, *F. gracilis*. [Spiropt.]. *Thelazia*, p. 318.
- \**papillosum* Blome, 1909, t.h. *Tetrao urogallus*. [Trichosoma]. *Capillaria*, p. 27.



- papillosum* Polonio, 1860, t.h. *Mus rattus*. [Calodium]. *Capillaria*, p. 27.
- papillosum* Wedl, 1856, t.h. sheep. [Trichosoma]. *Strongyloides*, p. 20.
- \**papillosus* Molin, 1859, t.h. *Larus ridibundus*. *Cosmocephalus*, p. 338.
- papillosus* Rud., 1802, t.h. *Corvus caryocatactes*. [Str.]. *Eustrongylides*, p. 180.
- \**papillosus* Zeder, 1800, t.h. *Esox lucius*. [Cucullanus]. *Camallanus*, p. 378.
- papillotrunca* Molin, 1860, t.h. *Myrmecophaga jubata*. *Physaloptera*, p. 354.
- paradoxa* Cobbold, 1864, t.h. *Sus scrofa* dom. *Simondsia*, p. 310.
- \**paradoxa* Linstow, 1904, host unknown. [Rictularia]. *Seuratia*, p. 335.
- paradoxa* Linstow, 1906, t.h. *Didelphys dorsigera*. *Heterakis*, p. 216.
- paradoxa* Linstow, 1908, t.h. *Varanus albigularis*. *Physaloptera*, p. 354.
- paradoxus* Diesing, 1835, t.h. *Cathartes urubu*. [Tropisurus]. *Tetrameres*, p. 361.
- \**paradoxus* Mehlis, 1831, in part, t.h. *Sus scrofa* dom. [Str.]. *Metastrongylus*, p. 160.
- paradoxus* Travassos, 1918, t.h. *Molossidae*. *Histiostongylus*, p. 133.
- paraneator* Travassos and Horta, 1915, t.h. *Equus asinus*. *Acheilostoma*, p. 49.
- parile* Kowalewsky, 1903, t.h. *Bubo maximus*. [Trichosoma]. *Capillaria*, p. 27.
- paronai* Linstow, 1893, t.h. *Macroscincus coctei*. [Oxy.]. *Tachygonetria*, p. 200.
- \**paronai* Porta, 1908, t.h. *Mus rajah*. *Gnathostoma*, p. 340.
- paronai* Stossich, 1897, t.h. *Buceros nasutus*. [Fil.]. *Diplotriana*, p. 434.
- paronai* Stossich, 1902, t.h. *Amphibolurus muricatus*. [Str.]. *Strongyluris*, p. 223.
- parroti* Seurat, 1917, t.h. rock partridge. *Cyrnea*, p. 300.
- parva* Gendre, 1923, t.h. *Trachelotis senegalensis*. *Hadjelia*, p. 302.
- parva* Neveu-Lemaire, 1925, t.h. African rhinoceros. *Quilonia*, p. 73.
- parvovum* Sweet, 1910, t.h. *Gallus domesticus*. *Oxyspirura*, p. 320.
- parvumspinosa* Railliet and Henry, 1911, t.h. *Rhea americana*. *Capillaria*, p. 27.
- parvus* Chapin, 1925, t.h. *Nucifraga caryocatactes*. *Syngamus*, p. 157.
- parvus* Ortlepp, 1923, t.h. *Coronella getula*. *Kalicephalus*, p. 114.
- patagonica* Linstow, 1880, t.h. *Phoca jubata*. [Asc.]. *Anisakis*, p. 273.
- pateratum* Yorke and Macfie, 1919, t.h. Equines. [Cylicost.]. *Trichonema*, p. 56.
- pavonis* Baylis and Daubney, 1922, t.h. *Pavo muticus*, *P. cristatus*. *Pseudaspidodera*, p. 221.
- pawlowskyi* Skrjabin, 1923, t.h. *Otomela phoenicuroides*. *Splendidofilaria*, p. 421.
- pectinata* Ransom, 1907, t.h. *Bos taurus*. *Cooperia*, p. 132.
- \**pectinatus* Diesing, 1838, t.h. *Podocnemis expansa*. *Ancyracanthus*, p. 365.
- pectinifera* Neumann, 1900, t.h. *Gallus* dom. [Spropt.]. *Streptocara*, p. 360.
- \**pelagica* Seurat, 1916, t.h. *Larus canus*, *Puffinus kuhli*. [Acuaria]. *Seuratia*, p. 335.
- pelecani* Chatin, 1874, t.h. *Pelecanus onocrotalus*. [Sclerost.]. *Gnathostoma*, p. 340.
- pellucidum* Jaegerskiöld, 1893, t.h. *Tetrodon stellatus*. [Ichthyonema]. *Philometra*, p. 443.
- \**pendula* Leidy, 1851, t.h. *Emys guttata*. [Synplecta]. *Hedruris*, p. 375.
- penita* Leidy, 1886, t.h. *Trachemys scabra*. [Asc.]. *Cissophyllus*, p. 242.
- perarmata* Linstow, 1910, t.h. *Cinixys belliana*. *Atractis*, p. 245.
- perarmata* Ratzel, 1868, t.h. *Tarsius spectrum*. [Het.]. *Subulvra*, p. 228.
- \**pereboomii* Göze, 1782, t.h. man. [Stomachida]. *Ascaris*, p. 256.
- perezi* Gendre, 1911, t.h. *Chamaeleon gracilis*. [Oxysoma]. *Aplectana*, p. 209.
- \**perforans* Molin, 1858, t.h. *Mustela martes*, etc. *Filaria*, p. 391.
- pergracilis* Cobbold, 1873, t.h. grouse. [Str.]. *Trichostrongylus*, p. 119.
- perniciusum* Linstow, 1885, t.h. *Felis tigris*. [Ankylostomum]. *Galoncus*, p. 95.
- perpapillatus* Jaegerskiöld, 1909, t.h. *Ardea leucos*, *Herodias egretta*. *Eustrongylides*, p. 180.
- perspicillum* Rud., 1803, t.h. *Meleagris gallopavo*. [Asc.]. *Ascaridia*, p. 268.
- perstans* Manson, 1891, t.h. Homo. [Fil.]. *Dipetalonema*, p. 427.
- phacochæri* Allgén, 1921, t.h. *Phacochærus æthiopicus*. *Odontogeton*, p. 213.
- phacochæri* Geddoelst, 1918, t.h. *Phacochærus africanus*. *Ascaris*, p. 257.
- philodryadus* Ortlepp, 1923, t.h. *Philodryas serra*. *Kalicephalus*, p. 114.
- phlebotomus* Railliet, 1900, t.h. ruminants. [Monodontus]. *Bunostomum*, p. 109.

- phænicopteri* Seurat, 1916, t.h. *Phænicopterus roseus*. [Acuaria]. Echinuria, p. 332.
- phoxini* Linstow, 1887, t.h. *Phoxinus lævis*. [Asc.]. Contracæcum, p. 282.
- phrynosoma* Ortlepp, 1922, t.h. *Phrynosoma cornutum*. Physaloptera, p. 354.
- physalura* Bremser, 1851, t.h. *Alcedo amazona*, etc. [Fil.]. Monopetalonema, p. 438.
- \**physalura* Duj., 1845, t.h. *Falco com.*, etc. [Spiropt.]. Physaloptera, p. 353.
- physeteris* Baylis, 1923, t.h. *Physeter catodon*. Anisakis, p. 273.
- physignathi* Baylis, 1924, t.h. *Physignathus leaeurii*. Physaloptera, p. 354.
- \**picum* Leidy, 1856, not Rud., 1819, t.h. *Picus colaris*. [Trichosoma]. Capillaria, p. 26.
- picum* Rud., 1819, t.h. *Picus canus*, etc. [Trichosoma]. Capillaria, p. 27.
- \**pictus* Creplin, 1849, *trachealis* re-named. [Str.]. Syngamus, p. 157.
- pimentata* Geddoelst, 1917, t.h. *Sciurus prevosti*. Subulura, p. 228.
- pimentata* Linstow, 1897, t.h. *Cercopithecus albigularis*. [Spiropt.]. Streptopharagus, p. 312.
- pimentatus* Linstow, 1904, t.h. *Lepus nigricollis*. [Str.]. Trichostrongylus, p. 119.
- pitateum* Railliet, Henry, and Bauche, 1914, t.h. elephant. [Cyclost.]. Amira, p. 83.
- pillersi* n.sp., t.h. blue warbler flycatcher. Coronofilaria, p. 410.
- \**pinguicola* Verrill, 1870, t.h. *Sus scrofa dom.* [Sclerost.]. Stephanurus, p. 52.
- pinnatifidus* Diesing, 1839, t.h. *Podocnemis expansa*. Ancyracanthus, p. 365.
- piscicola* Baylis and Daubney, 1922, t.h. *Barbus tor*. Monhystrides, p. 253.
- \**plagiostoma* Parona, 1880, not Wedl, 1861, t.h. *Sciurus melanogaster*. Rictularia, p. 345.
- plagiostoma* Wedl, 1861, t.h. *Erinaceus auritus*. [Pterygodermatites]. Rictularia, p. 345.
- plica* Rud., 1819, t.h. *Canis lupus*. [Trichosoma]. Capillaria, p. 27.
- plotina* Baylis, 1919, t.h. *Plotus rufus*. Subulura, p. 228.
- pluridentatum* Alessandrini, 1905, t.h. *Oncoides (Felis) mitis*. [Unc.]. Ancylostoma, p. 93.
- \**pluridentatum* Quiel, 1919, t.h. Equines. Poterostomum, p. 61.
- poculatum* Looss, 1900, t.h. Equus cab. [Cyathost.]. Trichonema, p. 56.
- poculum* Linstow, 1904, t.h. Equus cab. Oxyuris, p. 185.
- poculum* Linstow, 1909, t.h. *Francolinus adpersus*. [Het.]. Subulura, p. 228.
- poeli* Vryburg, 1897, t.h. ox. [Fil.]. Elæophora, p. 416.
- \**polaris* Looss, 1911, t.h. *Vulpes lagopus*. Uncinaria, p. 102.
- polygyrus* Duj., 1845, t.h. *Arvicola arvalis*, *Mus sylvaticus*. [Str.]. Heligmosomoides, p. 146.
- polyoon* Linstow, 1909, t.h. *Xerus setosus*. [Oxy.]. Dermatoxys, p. 190.
- præcinctus* Duj., 1845, t.h. *Muræna conger*. [Stelmus]. Cucullanus, p. 383.
- prælonga* Duj., 1845, t.h. *Colymbus auritus*. [Asc.]. Porroecæcum, p. 281.
- præputialis* Linstow, 1889, t.h. *Felis catus*. [Physalopt.]. Chlamydonema, p. 356.
- prashadi* Baylis and Daubney, 1922, t.h. *Bungarus fasciatus*. Camallanides, p. 379.
- \**primitivus* Molin, 1861, t.h. *Phasianus gallus*, etc. Syngamus, p. 157.
- prionodes* Kotlán, 1921, t.h. Equines. [Cyclost.]. Trichonema, p. 56.
- pristis* Baylis and Daubney, 1922, t.h. *Pristis perotteti*. Porroecæcum, p. 281.
- problematicum* Schulz, 1924, t.h. Muridæ. Gongylonema, p. 314.
- probolurus* Railliet, 1896, t.h. *Camelus dromedarius*. [Str.]. Trichostrongylus, p. 119.
- procellariæ* Diesing, 1851, t.h. *Procellaria anglorum*. [Spiropt.]. Seuratia, p. 335.
- procyonis* Baylis and Daubney, 1923, t.h. *Procyon* sp. Tetragomphus, p. 107.
- proni* Seurat, 1915, t.h. *Herpestes ichneumon*. Rictularia, p. 345.
- protractum* Duj., 1845, t.h. *Vanellus cristatus*. [Trichosoma]. Capillaria, p. 27.
- psophiæ* Travassos, 1913, t.h. *Psophia viridis*. Heterakis, p. 216.
- pterophora* Creplin, 1854, t.h. *Dicholophorus cristatus*. [Asc.]. Ascaridia, p. 268.
- ptilopachydis* Gendre, 1920, t.h. *Ptilopachys fuscus*. Acuaria, p. 330.
- pudendotectus* Wostokow, 1905, t.h. pig. Metastrongylus, p. 160.
- pudica* Seurat, 1914, t.h. *Cerastes vipera*, etc. Thubunæa, p. 359.

- pudica* Travassos, 1921, t.h. *Dasypsecta agouti*. Viannaia, p. 150.
- pugionatus* Schlotthauber, 1860, t.h. *Corvus pica*, *Sturnus vulg.* Syngamus, p. 157.
- pugnicaudatum* Leiper, 1909, t.h. *Phacochærus æliani massaicus*. [Cylichnost.].  
Murshidia, p. 80.
- pulcherrimus* Barreto, 1918, t.h. *Caranx lugubris*. Cucullanus, p. 383.
- pulchrum* Molin, 1857, t.h. *Sus scrofa fera*. Gongylonema, p. 314.
- \**pulchrum* Seurat, 1912 and 1914, not Molin, 1857, t.h. *Erinaceus algirus*. Gongy-  
lonema, p. 314.
- \**pulmonalis* Froelich, 1802, in part, t.h. *Lepus* sp. [Fil.]. Capillaria, p. 26, and  
Synthetocaulus, p. 163.
- punctata* Geddoelst, 1916, t.h. *Pseudotantulus ibis*. [Kathleena]. Contracæcum,  
p. 282.
- punctatus* Linstow, in Schnyder, 1907, t.h. *Bos taurus*. [Str.]. Cooperia, p. 132.
- pungens* Schneider, 1866, t.h. *Turdus cyaneus*. [Fil.]. Diplotriæna, p. 434.
- pusilla* Miranda, 1924, t.h. *Amphibæna* sp. Aplectana, p. 209.
- pusilla* Seurat, 1918, t.h. tortoises. Tachygonetria, p. 200.
- pusilla* Travassos, 1914, t.h. *Didelphis aurita*. Viannaia, p. 150.
- pusilla* Travassos, 1914, t.h. *Sturnira lilium*. Capillaria, p. 27.
- pusilla* Travassos, 1915, t.h. *Turdus rufiventris*, *Platycichla flavipes*. Tetrameres,  
p. 363.
- putaustialis* Lane, 1914, t.h. domestic fowl. Heterakis, p. 216.
- putorii* Rud., 1819, t.h. *Mustela putorius*. [Trichosoma]. Capillaria, p. 27.
- pyramidalis* Linstow, 1879, t.h. *Cholæpus didactylus*. Physaloptera, p. 354.
- pyromelanæ* n.sp., t.h. *Pyromelana oryx*. Diplotriæna, p. 434.
- \**pythonis* Retzius, 1830, of Railliet and Henry, 1910, in part, t.h. *Python bivittatus*.  
[Asc.]. Polydelphis, p. 266.
- quadricornis* Wedl, 1862, t.h. *Uræus haje*. [Asc.]. Polydelphis, p. 266.
- quadriscuspe* Walton, 1923, t.h. *Buforides virescens virescens*. Contracæcum, p. 282.
- \**quadridentatum* Molin, 1861, t.h. *Mycetes coraya*. [Diploodon]. Ancylostoma, p. 93.
- quadridentatus* Molin, 1858, t.h. *Mustelus plebejus*. Acanthocheilus, p. 288.
- \**quadridentatus* Siebold, 1851, *duodenale* re-named. [Str.]. Ancylostoma, p. 92.
- quadrilabiata* Molin, 1858, t.h. *Tinamus rufescens*, *T. maculosus*. [Fil.]. Tetra-  
cheilonema, p. 439.
- quadriloba* Rud., 1819, t.h. *Picus viridis*. [Spiropt.]. Acuaria, p. 330.
- quadrirapillosa* Molin, 1860, t.h. *Platalea ajaja*. [Spiropt.]. Pelecitus, p. 412.
- quadriradiatus* Stevenson, 1904, t.h. *Columba livia dom.* [Str.]. Ornithostongylus,  
p. 128.
- \**quadriscipina* Diesing, 1851, t.h. *Mustela foina*, etc. Filaria, p. 391.
- quadriverrucosa* Molin, 1858, t.h. *Dendrocalaptes picus*. [Fil.]. Diplotriæna, p. 434.
- quadrivittati* Hall, 1916, t.h. *Eutamias quadrivittatus*. Warrenius, p. 151.
- quadrovaria* Leiper, 1908, t.h. *Varanus niloticus*. Physaloptera, p. 354.
- \**quilona* Lane, 1914, t.h. *Elephas indicus*. Quilonia, p. 73.
- radiata* Linstow, 1906, t.h. *Leptonychotes weddelli*. [Asc.] Contracæcum, p. 282.
- radiatum* Looss, 1900, t.h. *Equus*. [Cyathost.]. Trichonema, p. 56.
- radiatus* Rud., 1803, t.h. *Bos taurus*. [Str.]. Œsophagostomum, p. 87.
- \**radiatus* Rud. of Schneider, 1866, t.h. *Bos taurus*. [Str.]. Bunostomum, p. 109.
- radiosa* Schneider, 1866, t.h. *Echidna rhinocerotis*. [Asc.]. Ophidascaris, p. 263.
- \**radula* Schneider, 1866, t.h. *Paradoxurus philippinensis*. [Fil.]. Gnathostoma, p. 340.
- raillieti* Neveu-Lemaire, 1924, t.h. African rhinoceros. [Henryella]. Murshidia,  
p. 80.
- raillieti* Skrjabin, 1915, t.h. *Fulica atra*. Amidostomum, p. 154.
- raillieti* Travassos, 1913, t.h. *Didelphis aurita*. Aspidodera, p. 220.
- rajæ* Diesing, 1851, t.h. *Raja batis*, *R. clavata*. [Spiropt.]. Proleptus, p. 358.

- ransomi* Chapin, 1922, t.h. pig. *Gongylonema*, p. 314.
- ransomia* Barker and Noyes, 1915, t.h. *Fiber zibethicus*. *Capillaria*, p. 27.
- rara* Hall and Wigdor, 1918, t.h. *Canis familiaris*. *Physaloptera*, p. 354.
- rátzii* Kotlán, 1919, t.h. Equines. [Cylicost.]. *Poteriostomum*, p. 61.
- rátzii* var. *nana* Theiler, 1923, t.h. Equines. *Poteriostomum*, p. 61.
- reclinata* Rud., 1819, t.h. *Crotophaga major*, *C. minor*. [Asc.]. *Subulura*, p. 228.
- recondita* Grassi, 1890, t.h. *Canis fam.* [Fil.]. *Dipetalonema*, p. 427.
- recta* Linstow, 1879, t.h. *Podiceps cristatus*. [Fil.]. *Streptocara*, p. 360.
- rectangula* Linstow, 1906, t.h. *Leptonychotes weddelli*. [Asc.]. *Contracæcum*, p. 282.
- \**recticaudata* Costa, 1845, *globiceps* re-named. *Philometra*, p. 443.
- rectovaginat* Molin, 1860, t.h. *Falco ater*. [Disph.]. *Acuaria*, p. 330.
- \**rectum* Linstow, 1907, t.h. *Elephas africanus*. [Sclerost.]. *Murshidia*, p. 80.
- \**rectum* Linstow, 1899, t.h. *Canis megalotis*, *C. vulpeula*. *Oxyntema*, p. 230.
- \**rectus* Linstow, 1906, t.h. *Dolichotis patagonica*. [Str.]. *Graphidioides*, p. 140.
- rectus* Molin, 1860, t.h. *Falco femoralis*, *F. uncinatus*. [Disph.]. *Acuaria*, p. 330.
- recurvata* Linstow, 1901, t.h. *Eurystomus afer*. [Het.]. *Subulura*, p. 228.
- recurvum* Solger, 1877, t.h. *Crocodylus acutus*. [Trichosoma]. *Capillaria*, p. 27.
- renalis* Goëze, 1782, t.h. *Canis familiaris*. [Asc.]. *Dioctophyme*, p. 178.
- \**renium* Drabble, 1922, t.h. pig. [Sclerost.]. *Stephanurus*, p. 52.
- rennieri* Railliet, Henry, and Joyeux, 1913, t.h. elephant. [Evansia]. *Quilonia*, p. 73.
- repens* Railliet and Henry, 1911, t.h. *Canis fam.* *Dirofilaria*, p. 394.
- resectum* Duj., 1843, t.h. *Corvus monedula*. [Trichosoma]. *Capillaria*, p. 27.
- reticulata* Diesing, 1841, t.h. *Equus cab.* *Onchocerca*, p. 414.
- reticulata* Linstow, 1899, t.h. *Ardea cocoi*. [Asc.]. *Porrocæcum*, p. 281.
- reticulata* Schlotthauber, 1860, t.h. *Equus cab.* *Piguris*, p. 448.
- \**retortæformis* Bremser, 1811, not Zeder, 1800, t.h. *Lepus cuniculus fer.* [Str.]. *Graphidium*, p. 135.
- retortæformis* Zeder, 1800, t.h. *Lepus*. [Str.]. *Trichostrongylus*, p. 119.
- retusa* Rud., 1819, t.h. *Lacerta teguixin*. *Physaloptera*, p. 354.
- retusum* Railliet, 1893, t.h. *Gallus gallus*. [Trichosoma]. *Capillaria*, p. 27.
- revoluta* Rud., 1819, t.h. *Charadrius himantopus*. [Spiropt.]. *Chevreuxia*, p. 333.
- rheæ* Owen, 1843, t.h. *Rhea americana*, etc. [Fil.]. *Contortospiculum*, p. 430.
- rhinocerotis* Neveu-Lemaire, 1924, t.h. African rhinoceros. *Buissonia*, p. 80.
- rhinocerotis* Neveu-Lemaire, 1924, t.h. African rhinoceros. [Memphisia]. *Murshidia*, p. 80.
- rhinocerotis* Neveu-Lemaire, 1924, t.h. rhinoceros. [Khalilia]. *Amira*, p. 84.
- rhinocerotis* Neveu-Lemaire, 1924, t.h. rhinoceros. *Quilonia*, p. 73.
- rhinocerotis* Thapar, 1924, t.h. African rhinoceros. *Kiluluma*, p. 71.
- rhodesi* (Desmarest, 1827) Railliet and Henry, 1910, for *rhodesii* (Desmarest, 1827) Blainville, 1828. *Thelazia*, p. 317.
- rhodesiense* n. sp., t.h. African elephant. *Parabronema*, p. 337.
- rhodesiensis* Yorke and Macfie, 1920, t.h. zebra. *Cylindropharynx*, p. 65.
- rhodesii* (Desmarest, 1827) Blainville, 1828, t.h. *Bos taurus*. *Thelazia*, p. 317.
- rigida* Rud., 1909, t.h. *Lophius piscatorius*. [Asc.]. *Contracæcum*, p. 282.
- rigidulum* Duj., 1845, t.h. *Accentor modularis*. [Trichosoma]. *Capillaria*, p. 27.
- rima* Linstow, 1906, t.h. *Otis haubara*. [Het.]. *Subulura*, p. 228.
- rimula* Linstow, 1903, t.h. *Centropus sinensis*. [Het.]. *Subulura*, p. 228.
- rischia* Skrjabin, 1923, t.h. *Pseudaspis leptcephalus*. *Philometra*, p. 443.
- robusta* Beneden, 1871, t.h. *Raja circularis*. [Coronilla]. *Proleptus*, p. 358.
- \**robusta* Drasche, 1884, t.h. *Testudo græca*. [Oxy.]. *Mehdiella*, p. 201.
- robustum* Giles, 1892, t.h. *Equus mulus*. [Sclerost.]. *Cesophagodontus*, p. 43.
- \**robustus* Diesing, 1838, t.h. *Felis concolor*. [Cheiracanthus]. *Gnathostoma*, p. 340.
- rodentorum* Hall, 1916, t.h. *Thomomys fossor*. *Ransomus*, p. 42.
- rodhaini* Geddoelst, 1916, t.h. *Plotus rufus*. [Kathleena]. *Contracæcum*, p. 282.

- raemeri* Linstow, 1905, t.h. *Macropus antilopinus*. [Fil.]. *Dipetalonema*, p. 427.
- rondoni* Travassos, 1919, t.h. *Piaractus brachypomus*. *Rondonia*, p. 249.
- rosarius* Connal, 1912, t.h. *Nycticorax griseus*. [Asc.]. *Contracæcum*, p. 282.
- roscidus* Railliet, 1911, t.h. *Cervus* sp. *Nematodirus*, p. 137.
- roseus* Leidy, 1851, t.h. *Testudo* sp. [Cucullanus]. *Cissophyllus*, p. 242.
- rosmari* Baylis, 1916, *bicolor* Baird, 1868, re-named. [Asc.]. *Anisakis*, p. 273.
- rothschildi* Seurat, 1915, t.h. *Elephantulus deserti*. *Spirura*, p. 294.
- rotundata* Linstow, 1883, t.h. *Otis macquini*. [Fil.]. *Hartertia*, p. 306.
- rotundata* Molin, 1860, t.h. *Cantharus vulg.* [Dacnitis]. *Cucullanus*, p. 383.
- rotundatum* Linstow, 1903, t.h. *Centropus sinensis*. [Lissonema]. *Aprocta*, p. 406.
- rotundatum* Linstow, 1906, t.h. *Bufo viridis*. [Angiost.]. *Rhabdias*, p. 18.
- rotundatus* Linstow, 1907, t.h. *Lanius minor*. [Disph.]. *Acuaria*, p. 330.
- \**rubicunda* Schneider, 1866, t.h. *Python molurus*. [Asc.]. *Ophidascaris*, p. 263.
- rubidus* Hassall and Stiles, 1892, t.h. *Sus scrofa dom.* [Str.]. *Hyostrongylus*, p. 121.
- rubrovenosa* Schneider, 1866, t.h. *Bufo cinereus*. [Leptodera]. *Rhabdias*, p. 18.
- rubrum* Linton, 1892, t.h. *Spizella socialis*. [Trichosoma]. *Capillaria*, p. 27.
- rude* Rud., 1810, t.h. *Homo*. (not a parasite). [Diceras]. *Ditrachyceros*, p. 447.
- rudicaudatum* Railliet and Henry, 1909, t.h. *Lagost. trichodactylus*. [Graphidium]. *Graphidioides*, p. 140.
- rufescens* Leuckart, 1865, t.h. *Ovis aries*. [Str.]. *Synthetocaulus*, p. 164.
- rufus* Khalil, 1922, t.h. beaver. *Travassosius*, p. 131.
- rugatus* Monnig, 1925, t.h. sheep. *Trichostrongylus*, p. 119.
- ruwenzorii* Parona, 1907, t.h. *Arvicanthus abyssinicus*, *Mus ugandæ*. *Physaloptera*, p. 354.
- rytipleurites* Deslongchamps, 1824, t.h. *Blatta orientalis*. [Fil.]. *Spirura*, p. 294.
- sagitta* Linstow, 1907, t.h. *Tragelaphus scriptus*. [Fil.]. *Wuchereria*, p. 402.
- sagittatum* Kotlán, 1920, t.h. Equines. [Cylicost.]. *Trichonema*, p. 56.
- sagittatus* Mueller, 1890, t.h. *Cervus elephas*. [Str.]. *Synthetocaulus*, p. 164.
- saimiris* Cameron, 1923, t.h. *Saimiris sciurea*. *Viannaia*, p. 150.
- \**salaris* (Gmelin, 1790) Zeder, 1800, t.h. *Salmo salar*. [Capsularia]. *Porroecæcum*, p. 280.
- salmi* Gedoelst, 1923, t.h. pig. *Metastrongylus*, p. 160.
- samboni* Baylis, 1922, t.h. *Ceodou* (*Sphingurus*) *villosus*. *Wellcomia*, p. 197.
- sameera* Khalil, 1922, t.h. African elephant. *Amira*, p. 84.
- samoense* Lane, 1922, t.h. pig. [Crassisoma]. *Globocephalus*, p. 49.
- \**sangeri* Alessandrini, 1905, not Railliet, 1897, t.h. *Elephas indicus*. [Uncinaria]. *Bunostomum*, p. 109.
- sangeri* Cobbold, 1879, t.h. *Elephas indicus*. [Doch.]. *Bathmostomum*, p. 105.
- sanguinea* Rud., 1819, t.h. *Cyprinus gibelio*. [Fil.]. *Philometra*, p. 443.
- sanguinolenta* Rud., 1819, t.h. *Canis lupus*. [Spiropt.]. *Spirocerca*, p. 296.
- sarasinorum* Meyer, 1896, t.h. *Stenops gracilis*. [Fil.]. *Subulura*, p. 228.
- sauroicola* Chapin, 1924, t.h. *Testudo denticulata*. *Sauricola*, p. 62.
- scalprum* Linstow, 1908, t.h. *Raphicercus campestris*. [Fil.]. *Setaria*, p. 423.
- scapiceps* Leidy, 1866, t.h. *Lepus sylvaticus*. [Fil.]. *Dirofilaria*, p. 394.
- scelopori* Gedoelst, 1919, t.h. *Sceloporus undulatus*. *Cryptosomum*, p. 249.
- schebeni* Linstow, 1909, t.h. *Cynictis penicillata*. [Het.]. *Subulura*, p. 228.
- schizothoracis* Baylis and Daubney, 1922, t.h. *Schizothorax zarudnyi*. *Contracæcum*, p. 282.
- schmidtii* Linstow, 1874, t.h. *Mus decumanus*. [Trichosoma]. *Capillaria*, p. 27.
- \**scillicola* Beneden, 1871, t.h. *Mustelus vulg.* [Coronilla]. *Proleptus*, p. 358.
- sciuri* Parona, 1898, t.h. *Sciurus melanogaster*. *Physaloptera*, p. 354.
- scleratus* Travassos, 1923, t.h. *Tropidurus* sp. *Thelandros*, p. 193.
- \**sclerostomum* Molin, 1861, t.h. *Ciconia nigra*. *Syngamus*, p. 157.

- scoleciformis* Diesing, 1851, t.h. *Dasypus uncinatus*, etc. [Aspidoc.]. *Aspidodera*, p. 220.
- scotti* Leiper and Atkinson, 1914, t.h. *Diomedea melanophrys*. [Kathleena]. *Contractacæum*, p. 282.
- scutata* Leuckart, 1873, t.h. *Bos taurus*. [Fil.]. *Gongylonema*, p. 314.
- \**securiferum* Quiel, 1919, t.h. Equines. [Pseudosclerostomum]. *Æsophagodontus*, p. 44.
- sedecimradiatus* Linstow, 1899, t.h. *Cavia paca*. [Str.]. *Heligmostrongylus*, p. 145.
- \**semiarmatum* Molin, 1861, t.h. *Canis vulpes*. *Crenosoma*, p. 166.
- semicircularis* Molin, 1861, t.h. *Dicotyles torquatus*. [Monodontus]. *Eumonodontus*, p. 99.
- semilanceolata* Molin, 1860, t.h. *Nasua narica*. *Physaloptera*, p. 354.
- semilunaris* Molin, 1860, t.h. *Trogon*, etc. *T. melanurus*. [Spiropt.]. *Cyrnea*, p. 300.
- seniteres* Zeder, 1800, t.h. *Tringa vanellus*. [Fusaria]. *Porrocæum*, p. 281.
- sergenti* Seurat, 1921, t.h. *Passer hispaniolensis*. *Eufilaria*, p. 407.
- serpentulus* Diesing, 1851, t.h. *Falco rufipes*, etc. [Spiropt.]. *Pelecitus*, p. 412.
- serpentulus* Rud., 1809, t.h. *Ardea cinerea*. [Asc.]. *Porrocæum*, p. 281.
- serpula* Molin, 1858, t.h. *Phyllostoma brevicaudum*, etc. [Fil.]. *Solenonema*, p. 439.
- serrata* Lane, 1916, t.h. *Tryonix gangeticus*. *Serradacnitis*, p. 383.
- \**serrata* Linton, 1901, t.h. *Phycis tenuis*. [Fil.]. *Spinitectus*, p. 349.
- serrata* Schneider, 1866, t.h. *Penelope humeralis*. [Het.]. *Ascaridia*, p. 268.
- serratus* Linstow, 1879, t.h. *Felis dom.* [Trichoc.]. *Trichuris*, p. 23.
- serratus* Looss, 1900, t.h. Equus. [Triodontus]. *Triodontophorus*, p. 45.
- serratus* Wright, 1879, t.h. *Coregonus albus*. [Ancyracanthus]. *Cystidicola*, p. 324.
- setifera* Cobb, 1898, t.h. *Macropus* sp. *Zoniolaimus*, p. 176.
- setosa* Seurat, 1918, t.h. tortoise. *Tachygonetria*, p. 200.
- seurati* Barreto, 1917, t.h. *Caccabis rufa*, *C. petrosa*. *Subulura*, p. 228.
- seurati* Skrjabin, 1917, t.h. *Falco cenchris*. *Habronema*, p. 298.
- sewelli* Baylis and Daubney, 1922, t.h. *Cœlopeltis monspessulana*. *Polydelphis*, p. 266.
- sezalata* Molin, 1860, t.h. *Dicotyles albirostris*, *Sus scrofa fera*. [Spiropt.]. *Physocephalus*, p. 308.
- \**sezalata* var. *cristata* Seurat, 1912, t.h. dromedary. [Spiropt.]. *Physocephalus*, p. 308.
- shipleyi* Stossich, 1900, t.h. *Diomedea exulans*. [Gnathost.]. *Seuratia*, p. 335.
- siamensis* Baylis, 1920, t.h. *Hieremys* (*Cyclemys*) *annandalei*. [Falcaustra]. *Spiro-noura*, p. 239.
- \**siamensis* Levinsen, 1889, t.h. *Homo*. [Cheiracanthus]. *Gnathostoma*, p. 340.
- siamensis* Linstow, 1903, t.h. *Centropus sinensis*. [Cheilospirura]. *Oxyspirura*, p. 320.
- simiæ* Hung See Lu and Höppli, 1923, t.h., macaques. *Strongyloides*, p. 20.
- simile* Kowalewsky, 1903, t.h. *Turdus pilaris*. [Trichosoma]. *Capillaria*, p. 27.
- similis* Baird, 1853, t.h. seal. [Asc.]. *Anisakis*, p. 273.
- similis* Gendre, 1909, t.h. *Coracias abyssinicus*, etc. [Het.]. *Subulura*, p. 228.
- similis* Travassos, 1914, t.h. *Bos taurus*. *Hæmonchus*, p. 123.
- similis* Travassos, 1920, t.h. *Leptodactylus ocellatus*. *Oxyascaris*, p. 214.
- \**simplex* Duj., 1845, *Delphinus phocæna*. *Anisakis*, p. 272.
- simplex* Rud., 1809, t.h. delphin. [Asc.]. *Anisakis*, p. 273.
- simplicidens* Oortlepp, 1922, t.h. sleeping lizard. *Physaloptera*, p. 354.
- simpsoni* Goodey, 1924, t.h. warthog, roan antelope. *Æsophagostomum*, p. 87.
- simpsoni* Leiper, 1911, t.h. a large rodent. *Acheilostoma*, p. 49.
- simus* Daubney, 1923, t.h. *Naja nigricollis*. [Diaphanocephalus]. *Kalicephalus*, p. 114.
- sipunculiforme* Baird, 1859, t.h. elephant. [Sclerost.]. *Equinurbia*, p. 39.

- siredonis* Baird, 1858, t.h. *Siredon mexicanus*. Hedruris, p. 376.
- skrjabini* Baskakow, 1924, t.h. *Camellus bactrianus*, *C. dromedarius*. *Trichuris*, p. 23.
- skrjabini* Rasowska, 1924, t.h. *Camelus dromedarius*. *Parabronema*, p. 337.
- smithii* Cobbold, 1882, t.h. *Elephas indicus*. [Fil.]. *Parabronema*, p. 337.
- \**socialis* Leidy, 1858, t.h. *Mustela vison*. [Cheiracanthus]. *Gnathostoma*, p. 340.
- sokolowi* Skrjabin, 1916, t.h. *Halcyon senegaloides*. *Diplotriæna*, p. 434.
- solitaria* Linstow, 1903, t.h. *Dipsadomorphus dendrophilus*. [Asc.]. *Ophidascares*, p. 263.
- solitaria* Thapar, 1924, t.h. *Rhinoceros africanus*. *Kiluluma*, p. 71.
- sonsinoi* Linstow, 1894, t.h. *Chamaeleo vulg.* [Het.]. *Spinicauda*, p. 225.
- sonsinoi* Linstow, 1895, t.h. *Agama mutabilis*. *Physaloptera*, p. 354.
- sonsinoi* Parona, 1897, t.h. *Zamenis viridiflavus*. [Trichosoma]. *Capillaria*, p. 27.
- soricicola* Nishigori, 1924, t.h. *Sorex* sp. *Hepaticola*, p. 28.
- southwelli* Baylis and Lane, 1920, t.h. *Urogymnus asperimus*. *Echinocephalus*, p. 343.
- spathiger* Railliet, 1896, t.h. *Camelus dromedarius*. [Str.]. *Nematodirus*, p. 137.
- speciosum* Beneden, 1873, t.h. *Vespertilio daubentonii*, etc. [Trichosoma]. *Capillaria*, p. 27.
- spectatus* Travassos, 1923, t.h. *Piaractus brachypomus*. [Spectatus]. *Spironoura*, p. 239.
- spelea* Leidy, 1875, t.h. *Macropus* sp. [Fil.]. *Setaria*, p. 423.
- spermospiza* Linstow, 1879, t.h. *Spermospiza guttata*. [Fil.]. *Diplotriæna*, p. 434.
- sphærocephala* Goodey, 1924, t.h. *Bufo vulgaris*. *Rhabdias*, p. 18.
- sphærocephala* Rud., 1809, t.h. *Acipenser sturio*. [Asc.]. *Tanqua*, p. 342, or *Cucullanus*, p. 383.
- spiculigera* Rud., 1809, t.h. *Pelecanus onocrotalus*. [Asc.]. *Contracæcum*, p. 282.
- spinicauda* Duj., 1845, t.h. *Lacerta muralis*. [Oxy.]. *Pharyngodon*, p. 193.
- spinicauda* Olfers, 1819, t.h. *Lacerta teguixin*. [Asc.]. *Spinicauda*, p. 224.
- spinicollis* Baylis, 1923, t.h. *Lutra* sp., *Atilax paludinosus*. *Clæoascaris*, p. 283.
- spinifera* (Rud. or Schneider) Solowiow, 1912, t.h. *Scelopax gallinula*. *Echinuria*, p. 332.
- spinigerum* Owen, 1836, t.h. *Felis tigris*. *Gnathostoma*, p. 340.
- spinosa* Gendre, 1923, t.h. *Falco tinnunculus*. *Habronema*, p. 298.
- spinosissimus* Linstow, in Shipley and Hornell, 1905, t.h. *Myliobatis aquila*. [Cheiracanthus]. *Echinocephalus*, p. 343.
- \**spinosum* Willemose-Suhm, 1869, t.h. *Brachyotus mystacinus*. [Ophiost.]. *Rictularia*, p. 345.
- spinulosum* Linstow, 1890, t.h. *Fuligula ferina*. [Trichosoma]. *Capillaria*, p. 27.
- spinulosus* Diesing, 1839, t.h. *Sudis gigas*. [Lecanoc.]. *Gœzia*, p. 286.
- spinulosus* Linstow, 1879, t.h. *Capra ibex*. [Str.]. *Eucyathostomum*, p. 85.
- spinulosus* Molin, 1860, t.h. *Glareola austriaca*. [Fil.]. *Schistorophus*, p. 367.
- spirale* Molin, 1857, t.h. *Cervus dama*. *Gongylonema*, p. 314.
- spirale* Molin, 1858, t.h. *Ibis falcinellus*. [Trichosoma]. *Capillaria*, p. 27.
- spiralis* Baylis, 1923, t.h. *Heterobranchus anguillaris*. *Procamallanus*, p. 380.
- \**spiralis* Diesing, 1851, t.h. *Alca torda*, *Larus maximus*, etc. [Histioc.]. *Cosmocephalus*, p. 338.
- spiralis* Molin, 1858, t.h. *Phasianus gallus*. [Disph.]. *Acuaria*, p. 330.
- spiralis* Molin, 1860, t.h. *Bradypus didactylus*. [Spiropt.]. *Oxyspirura*, p. 321, or *Onchocerca*, p. 414.
- spiralis* Owen, 1835, t.h. *Homo*. [Trichina]. *Trichinella*, p. 33.
- spiralis* Rud., 1795, t.h. *Strix aluco*. [Asc.]. *Porrocaecum*, p. 281.
- spiralis* Schneider, 1866, t.h. *Amphisbæna* sp. *Physaloptera*, p. 354.
- spiralis* Seurat, 1915, t.h. *Bubulcus lucidus*. [Tropidocerca]. *Tetrameres*, p. 363.
- \**spirillum* Pallas, 1781, t.h. *Lacerta apoda*. [Tania]. *Sclerotrichum*, p. 30.

- spirostrongylus* n. sp., t.h. *Macropus* sp. *Spirostrongylus*, p. 70.
- spirula* Hempr. and Ehrenb., 1828, t.h. *Hyrax capensis*. *Physaloptera*, p. 355.
- splenæcum* Duj., 1843, t.h. *Sorex araneus*. [*Trichosoma*]. *Capillaria*, p. 27.
- splendida* Hall, 1913, t.h. *Canis nebracensis*. *Rictularia*, p. 345.
- spumosa* Schneider, 1866, t.h. *Mus decumanus*. [*Het.*]. *Ganguleterakis*, p. 218.
- squali* Duj., 1845, t.h. *Squalus galeus*. [*Dacnitis*]. *Serradacnitis*, p. 383.
- squamata* Linstow, 1883, t.h. *Phalacrocorax carbo*. [*Fil.*]. ? *Acuaria*, p. 330, and ? *Echinuria*, p. 332.
- squamata* Linstow, 1909, t.h. *Clemmys guttata*. *Hedruris*, p. 376.
- squatinae* Baylis, 1923, t.h. *Squatina squatina*. *Paranisakis*, p. 274.
- stellæ-polaris* Parona, 1901, t.h. *Fulmarus glacialis*. [*Histioc.*]. *Streptocara*, p. 360.
- stelmoïdes* Vessicelli, 1910, t.h. *Petromyzon planeri*. [*Dacnitis*]. *Cucullanus*, p. 383.
- stenocephala* Railliet and Henry, 1907, t.h. *Leptonychotes weddelli*, *Stenorhynchus leptonyx*. [*Asc.*]. *Contracæcum*, p. 282.
- stenocephalus* Railliet, 1884, t.h. *Canis familiaris*. [*Dochmius*]. *Uncinaria*, p. 102.
- stephanostomum* Stossich, 1904, t.h. gorilla. *Æsophagostomum*, p. 87.
- stephanostomum* var. *thomasi* Railliet and Henry, 1909, t.h. *Homo*. *Æsophagostomum*, p. 87.
- stercoralis* Bavay, 1876, t.h. *Homo*. [*Anguillula*]. *Strongyloides*, p. 19.
- stereura* Rud., 1819, t.h. *Falco nævius*. [*Spiropt.*]. *Thelazia*, p. 318.
- stewarti* Baylis and Daubney, 1922, t.h. *Kachuga smithii*, *Hardella thurgi*. [*Fal-caustra*]. *Spirooura*, p. 239.
- stigmatura* Leidy, 1866, t.h. *Salvelinus namaycush*. [*Fil.*]. *Cystidicola*, p. 324.
- stossichi* Setti, 1897, t.h. *Hystrix cristata*. [*Oxy.*]. *Syphacia*, p. 196.
- strelnikowi* Skrjabin, 1916, t.h. *Tinamus* sp. *Ascaridia*, p. 268.
- streptosophageus* Connal, 1912, t.h. *Agama colonorum*. *Strongyluris*, p. 223.
- \**striata* Linstow, 1883, t.h. *Tropidonotus hydrus*, *Ciconia alba*. [*Physalopt.*]. *Cyrnea*, p. 300.
- striata* Molin, 1858, t.h. *Felis concolor*, *F. macroura*. [*Fil.*]. *Dirofilaria*, p. 394.
- striata* Molin, 1858, t.h. *Felis concolor*, *F. macroura*. [*Fil.*]. *Solenonema*, p. 439.
- striatum* Linstow, 1879, t.h. *Astur nissus*. [*Trichosoma*]. *Capillaria*, p. 27.
- striatus* Monticelli, 1889, t.h. *Scyllium* sp. *Echinocephalus*, p. 343.
- striatus* Zeder, 1800, t.h. *Erinaceus europæus*. [*Str.*]. *Crenosoma*, p. 165.
- strigosus* Duj., 1845, t.h. *Lepus cuniculus fer.* [*Str.*]. *Graphidium*, p. 135.
- \**stroma* Linstow, 1884, t.h. *Mus sylvaticus*. [*Oxy.*]. *Syphacia*, p. 196.
- stroma* Linstow, 1899, t.h. *Grus paradisea*. [*Het.*]. *Ascaridia*, p. 268.
- strongylina* Rud., 1819, t.h. *Crypturus* sp., *Tetrao uru*. [*Asc.*]. *Subulura*, p. 228.
- strongylina* Rud., 1819, t.h. *Sus fera*. [*Spiropt.*]. *Arduenna*, p. 308.
- \**strongyloides* Dies., 1851, t.h. *Podinema teguixin*. *Diaphanocephalus*, p. 113.
- \**strongyloides* Leuckart, 1883, t.h. man. [*Rhabdonema*]. *Strongyloides*, p. 20.
- \**strumosa* Frœlich, 1791, t.h. *Talpa*. [*Asc.*]. *Spirura*, p. 294.
- strumosum* Reibisch, 1893, t.h. *Phasianus colchicus*. [*Trichosomum*]. *Capillaria*, p. 27.
- strumosus* Molin, 1861, t.h. *Coluber lichtensteinii*. *Kalicephalus*, p. 114.
- struthionis* Horst, 1885, t.h. *Struthio molybdophanes*. [*Sclerost.*]. *Codiostomum*, p. 46.
- \**sturni* Rud., 1809, t.h. *Sturnus*. [*Fil.*]. *Diplotrissæna*, p. 434.
- \**stylosa* Linstow, 1907, t.h. *Otis tarda*. *Heterakis*, p. 216.
- stylosa* Thapar, 1925, t.h. *Testudo ibera*. *Tachygonetria*, p. 200.
- stylosus* Linstow, 1907, t.h. *Rhinoceros africanus*. [*Deletroc.*]. *Kiluluma*, p. 71.
- styplocerca* Stossich, 1904, t.h. ducks. [*Het.*]. *Ascaridia*, p. 268.
- subæqualis* Molin, 1860, t.h. *Felis concolor*, *F. mellivora*. [*Spiropt.*]. *Cylicospirura*, p. 295.
- subalata* Schneider, 1866, t.h. *Falco* sp. *Physaloptera*, p. 355.



- subauricularis* Rud., 1819, t.h. *Rana musica*. [Str.]. *Oswaldocruzia*, p. 127.
- \**subcompressa* Zeder, 1803, t.h. *Homo*. [Tentacularia]. *Setaria*, p. 423.
- subcrenatus* Railliet and Henry, 1913, t.h. *Felis pardus*. *Hæmostrongylus*, p. 164.
- subcutanea* Linstow, 1899, t.h. *Erethizon dorsatus*. [Fil.]. *Dirofilaria*, p. 395.
- subrecta* Gendre, 1921, t.h. *Asturina monogrammica*. *Acuaria*, p. 330.
- subtile* Alessandrini, 1914, t.h. man. *Gongylonema*, p. 314.
- \**subtilis* Looss, 1895, t.h. *Homo*. [Str.]. *Trichostrongylus*, p. 119.
- subula* Duj., 1845, t.h. *Sylvia rubecula*. [Disph.]. *Acuaria*, p. 330.
- subulata* Rud., 1819, t.h. *Caprimulgus ruficollis*. [Asc.]. *Subulura*, p. 228.
- \**subulatum* Molin, 1861, t.h. *Sus scrofa dom.*, etc. *Cæophagostomum*, p. 87.
- subulatus* Molin, 1860, t.h. *Didelphys myosurus*. [Histioc.]. *Aspidodera*, p. 220.
- subulatus* Molin, 1861, t.h. *Lachesis rhombeata*, etc. *Kalicephalus*, p. 114.
- subventricosus* Schneider, 1866, t.h. *Rana cornuta*. [Str.]. *Oswaldocruzia*, p. 127.
- suctoria* Molin, 1860, in part, Drasche, 1883, t.h. *Caprimulgus campestris*. [Het.]. *Allodapa*, p. 229.
- sudanensis* Baylis, 1923, t.h. *Gerbillus gerbillus*. *Streptopharagus*, p. 312.
- sudanensis* Linstow, 1903, t.h. *Felis leo*. [Fil.]. *Dirofilaria*, p. 395.
- \**suilla* Duj., 1845, t.h. *Sus scrofa dom.* *Ascaris*, p. 256.
- \**suillus* Ackert and Payne, 1922, t.h. pig. *Necator*, p. 98.
- suis* (Lutz, 1894) Linstow, 1905, t.h. pig. [Rhabdonema]. *Strongyloides*, p. 20.
- \**suis* Rud., 1809, in part, t.h. *Aper*. [Str.]. *Metastrongylus*, p. 160.
- suis* Schrank, 1788, t.h. *Sus scrofa fera*. [Trichoc.]. *Trichuris*, p. 23.
- sulcata* Rud., 1819, t.h. *Testudo mydas*. [Asc.]. *Porrocaecum*, p. 281.
- \**sum* Gøze, 1782, t.h. *Sus scrofa dom.* *Ascaris*, p. 256.
- sygmoidea* Molin, 1860, t.h. *Corvus frugilegus*. [Spiropt.]. *Oxyspirura*, p. 321.
- sygmoideus* Molin, 1860, t.h. *Falco tridentatus*. [Disph.]. *Acuaria*, p. 330.
- tacapense* Seurat, 1915, t.h. *Ctenodactylus gundi*. [Ophiost.]. *Seuratum*, p. 351.
- tacapensis* Seurat, 1917, t.h. *Ctenodactylus gundi*. *Physaloptera*, p. 355.
- tadorna* Chatin, 1874, t.h. *Anas tadorna*, *Tadorna beloni*. [Cyathost.]. *Syngamus*, p. 157.
- \**tagumai* Morishita, 1922, t.h. *Bos taurus*. *Mecistocirrus*, p. 139.
- talpæ* Gmelin, 1790, t.h. *Talpa europæa*. [Asc.]. *Spirura*, p. 294.
- talpæ* Siebold, 1850, t.h. *Talpa europæa*. [Nematodeum]. *Capillaria*, p. 27.
- tanaisijchuki* Skrjabin, 1916, t.h. *Icteridæ*. *Oxyspirura*, p. 320.
- tarentolæ* Seurat, 1916, t.h. *Tarentola mauritanica*. *Acuaria*, p. 330.
- tectipenis* Geddoelst, 1919, t.h. grey lizard. *Pharyngodon*, p. 194.
- tenax* Mehlis in Creplin, 1844, t.h. *Raja clavata*. *Discophorus*, p. 447.
- tendo* Nitzsch, 1857, t.h. *Falco tendo*. [Fil.]. *Serratospiculum*, p. 428.
- tentaculata* Rud., 1819, t.h. *Didelphys cayopollin*, *D. quoaquiqua*. [Asc.]. *Cruzia*, p. 242.
- tentaculatus* Hemprich and Ehrenberg, 1828, t.h. *Hyrax capensis*. *Crossophorus*, p. 287.
- \**tenue* Duj., 1845, t.h. *Columba dom.* [Calodium]. *Capillaria*, p. 25.
- \**tenuicauda* Boulenger, 1920, t.h. *Equines*. *Craterostomum*, p. 45.
- tenuicauda* Linstow, 1883, t.h. *Perdix græca*. *Heterakis*, p. 216.
- tenuicauda* Linstow, 1901, t.h. *Equus crawshayi*. *Oxyuris*, p. 185.
- tenuicollis* Boulenger, 1916, t.h. *Equus*. *Triodontophorus*, p. 45.
- tenuis* Duj., 1845, t.h. *Saxicola rubetra*. [Disph.]. *Acuaria*, p. 330.
- tenuis* Duj., 1845, t.h. *Erinacæus europæus*. *Eucoleus*, p. 29.
- \**tenuis* Linstow, 1876, t.h. *Mergus merganser*. [Acanthophorus]. *Tetrameres*, p. 362.
- tenuis* Mehlis, 1846, t.h. *Phasianus colchicus*. [Str.]. *Trichostrongylus*, p. 119.
- \**tenuissimum* Diesing, 1851, t.h. *Columba dom.*, *C. livia*. [Trichosomum]. *Capillaria*, p. 25.
- \**tenuissimum* Leidy, 1891, t.h. *Mus decumanus*. [Trichosomum]. *Capillaria*, p. 26.

- tenuissimus* Rud., 1803, t.h. *Strix bubo*. [Trichoc.] Capillaria, p. 27.
- tercostata* Molin, 1860, t.h. *Psittacus æstivus*, *P. maximiliani*. [Spiropt.] Pelecitus, p. 412.
- terdentata* Molin, 1860, t.h. *Felis concolor*, *F. tigrina*. Physaloptera, p. 355.
- terdentatum* Linstow, 1898, t.h. *Ceratodus forsteri*. Amblyonema, p. 211.
- testudinis* Baylis and Daubney, 1922, t.h. *Testudo elongata*. [Falconstra.] Spiro-noura, p. 239.
- tetracanthum* Mehlis, 1831, of Looss, 1900, t.h. *Equus cab.* [Cylichnost.] Trichonema, p. 55.
- tetraptera* Nitzsch, 1821, t.h. *Mus musculus*. [Asc.] Aspicularis, p. 189.
- tetrapteryx* Linstow, 1907, t.h. *Synbranchus marmoratus*. Pterygifer, p. 444.
- tetrica* Travassos, 1917, t.h. *Aramides cajanea*. Tetrameres, p. 363.
- \**texana* Smith and Goeth, 1904, t.h. *Homo*. Ascaris, p. 256.
- tiara* Linstow, 1879, t.h. *Varanus ornatus*. [Asc.] Tanqua, p. 341.
- tiliquæ* Johnston, 1916, t.h. *Tiliqua scincoides*. Pneumonema, p. 347.
- \**tinami* Molin, 1858, t.h. *Tinamus*. [Fil.] Tetracheilonema, p. 439.
- tinamicola* Skrjabin, 1916, t.h. *Tinamus* sp. Diplotriæna, p. 434.
- tipula* Beneden, 1873, t.h. *Vespertilio daubentonii*, etc. [Str.] Histiostrongylus, p. 133.
- tomentosum* Duj., 1843, t.h. *Cyprinus idus*, etc. [Trichosoma] Capillaria, p. 27.
- tonaudia* Lane, 1914, t.h. *Chelone midas*. [Kathlania] Tonaudia, p. 237.
- torquata* Gendre, 1922, t.h. *Centropus monachus*. [Spiropt.] Torquatella, p. 373.
- torquata* Leidy, 1856, t.h. *Meles labradorica*. Physaloptera, p. 355.
- torresi* Travassos, 1920, t.h. *Agouti paca*. [Turgida] Physaloptera, p. 355.
- torus* Linstow, 1906, t.h. *Cistudo ornata*. Proleptus, p. 358.
- torulosus* Molin, 1861, t.h. *Cebus capucinus*. [Str.] Molineus, p. 126.
- totani* Linstow, 1875, t.h. *Totanus hypoleucos*. [Trichosoma] Capillaria, p. 27.
- trachea* Montagu, 1811, t.h. *Gallus*, etc. [Fasciola] Syngamus, p. 157.
- \**trachealis* Siebold, 1836, *trachea* Montague, 1811, re-named. Syngamus, p. 157.
- traguli* Vevers, 1922, t.h. *Tragulus stanleyanus*. Papillosetaria, p. 424.
- transfuga* Rud., 1819, t.h. *Ursus arctos*, *U. maritimus*. [Asc.] Toxascaris, p. 260.
- transversata* Linstow, 1907, t.h. *Cephalophus melanorheus*, *Troglodytes niger*. [Fil.] Setaria, p. 423.
- travancra* Lane, 1914, t.h. *Elephas indicus*. Quilonia, p. 73.
- travassosi* Barreto, 1919, t.h. *Bucco swainsoni*, *B. chacuru*. Subulura, p. 228.
- triacanthus* Diesing, 1853, t.h. *Scarabæus stercorarius*. Cephalacanthus, p. 386.
- trienucha* Wright, 1879, t.h. *Botaurus minor*. [Fil.] Streptocara, p. 360.
- trichiura* Linnæus, 1771, t.h. *Homo*. [Asc.] Trichuris, p. 22.
- trichosuri* Breinl, 1913, t.h. *Trichosurus vulpecula*. [Fil.] Breinlia, p. 401.
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- \**triquetra* Schrank, 1790, t.h. *Vulpes*. [Asc.]. *Toxocara*, p. 258.  
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*urosululatum* Alessandrini, 1909, t.h. *Sus scrofa* dom. [Crassisoma]. *Globocephalus*, p. 49.  
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- vallei* Stossich, 1895, t.h. *Vipera ammodytes*. [Doch.]. *Kalicephalus*, p. 114.  
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*\*visceralis* Gmelin, 1790, t.h. *Canis* fam. [Asc.]. *Dicotophyme*, p. 178.  
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*vituli* Brumpt, 1921, t.h. cattle. *Strongyloides*, p. 20.  
*vitulorum* Gœze, 1782, t.h. *Bos taurus*. *Ascaris*, p. 257.

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*volvulus* Leuckart, 1893, t.h. *Homo*. [Fil.]. Onchocerca, p. 414.  
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*westeri* Ihle, 1917, t.h. *Equus* cab. Strongyloides, p. 20.  
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